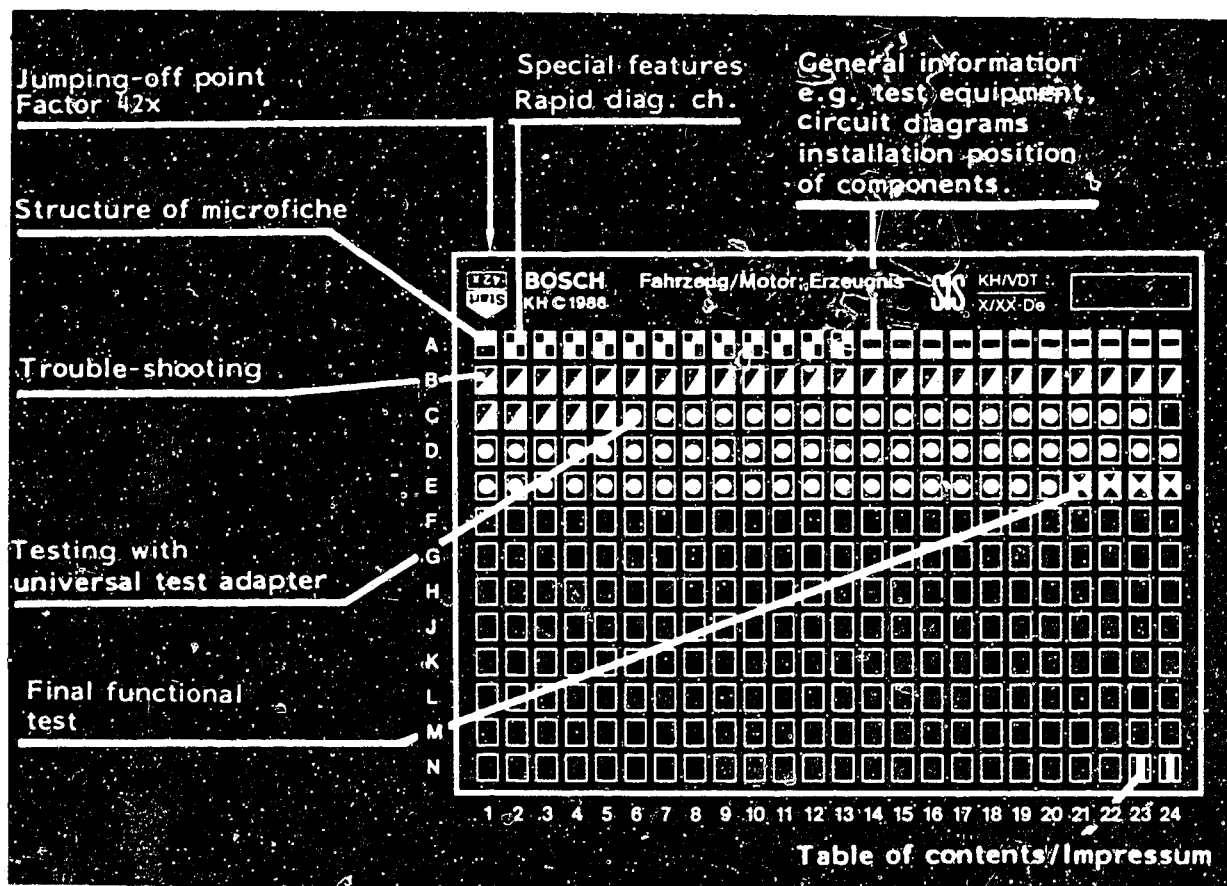


Structure of microfiche

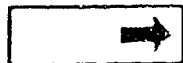


1. Read from left to right
2. Title of microfiche (appears on each coordinate)

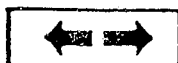
E16	Product/component/test step
	Vehicle/engine

Coordinate

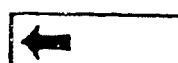
3. Limits of section



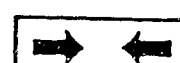
Beginning



Mid-section



End



One-page section

4. References to relevant test steps in test specifications; coordinate e.g. C6

C6

A1

Trouble-shooting program



1. Special features

Testing and repair instructions for a trip-computer system with TC 0 263 001 ..., installed in the Alfa 75 (successor to Giulietta)

2. Rapid diagnosis chart

The following rapid diagnosis chart makes it possible for the experienced expert to quickly test the trip computer and the associated sensors/sensor signals using normal workshop test equipment.

To do this, the universal test adapter is connected between trip computer and vehicle wiring harness using the adapter lead.

The contents of this chart refer to the following information:

- sequence of test steps
- switches/switch settings on universal test adapter
- test instructions and test specifications
- references to coordinates of the respective detailed testing and trouble-shooting program.

If detailed information and instructions are necessary, always proceed according to the trouble-shooting program starting on Coordinate B 1.



Requirements for testing

- Check the customer complaint.
(Check operation of trip computer according to vehicle owner manual).
- Electrical system (fuses, battery voltage O.K.)
- When working on the fuel system, observe accident prevention regulations as well as environmental and health regulations.
- Check all functions with the vehicle stationary and before removing the trip computer.
- Passenger compartment temperature $\geq 0^{\circ}\text{C}$.
- Original transmission/differential installed (otherwise change of distance per number of revolutions).
- Original tires (14") mounted (changed rolling circumference means change of distance per number of revolutions). Observe air pressure.
- Engine and injection system not tuned (allocation of input signals to fixed computer program of trip computer may change. Trip computer then shows incorrect readings).



Rapid diagnosis chart

Test step	Switch position	Component being tested, explanations (all measurements to ground)	Connection on 15-pin plug	Test specifications	Coordinate
	V ↓ Ω				
1	↓	1 Grounding test on TC	1	0 ... 10 Ω	C 6
2	↓	6 Only on Alfa 75 with LE-Jetr., code:8.181 Motronic, code: 8.89, 7.89, 9.91, 8.85, 7.85, 9.85. Tank sensor resistance (depending on tank contents)	5	0 ... 345 Ω	C 8
3	↓	7 Only on Alfa 75 with LE-Jetr., code:8.181, 7.184 L-Jetr., code:9.72 Carburetor, code: 8.56, 7.56, 9.10 Motronic, code: 8.88, 8.84, 7.88, 7.84, 9.90, 9.84 Grounding test, encoding cable 2 Pin 7 → pin 1	7	0 ... 10 Ω	C 12
4	↓	8 Grounding test, temperature sensor	8	0 ... 10 Ω	C 12
5	↓	11 Does not apply to Alfa 75 with carburetor. Motronic code: 8.84, 8.85, 7.84, 7.85, 9.84, 9.85 Grounding test, encoding cable 3 Pin 11 → pin 1	11	0 ... 10 Ω	C 16
6	↓	12 Does not apply to Alfa 75 with Motronic, code: 8.88, 8.84, 8.89, 7.88, 7.89, 7.84, 9.91, 9.90, 9.84 Grounding test, encoding cable 4 Pin 12 → pin 1	12	0 ... 10 Ω	C 18

A4

Rapid diagnosis chart

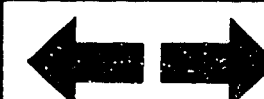
Alfa Romeo



A5

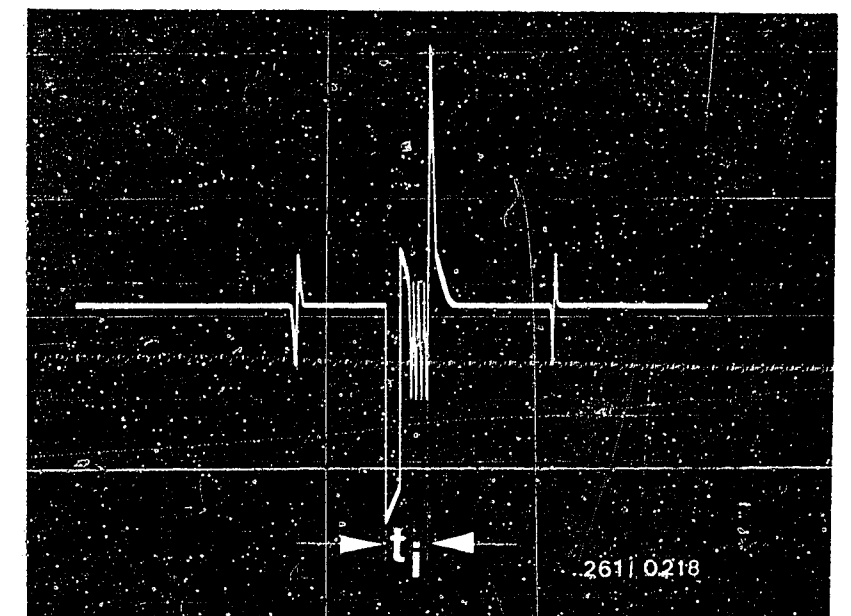
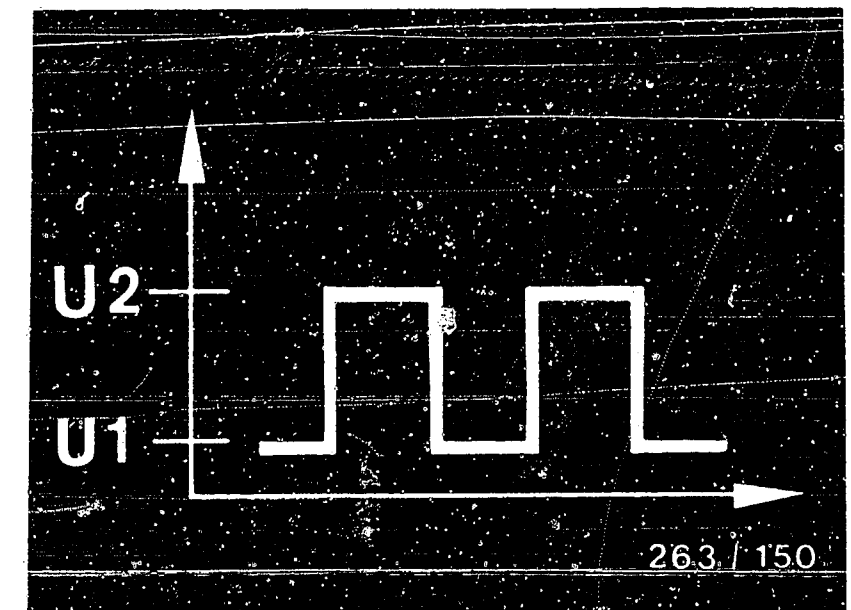
Rapid diagnosis chart

Alfa Romeo



Rapid diagnosis chart (continued)

Test step	Switch position	Component being tested, explanations (all measurements to ground)	Connection on 15-pin plug	Test specifications	Coordinate
	V Ω				
7	↓	Does not apply to Alfa 75 with Motronic, code: 7.85, 8.85, 9.85, 9.88 Grounding test, encoding cable 5 Pin 13 → pin 1	13	0 ... 10 Ω	C 20
8	↓	Only Alfa 75 with LE-Jetr., code: 8.181 Motronic, code: 8.85, 8.89, 7.85, 7.89, 9.91, 9.85, tank-sensor resistance (depending on tank contents)	14	0 ... 345 Ω	C 22
9	↓	Connection for flow sensor	15	approx. 20 000 Ω	D 3
10	1	- Voltage supply for TC from term. 30	2	Battery voltage	D 5
11	2	- Odometer sensor Test using oscilloscope with engine running and drive wheels turning. sensor	3	$U_1 > 0.2 \text{ V}$ $U_2 < 7 \text{ V}$ see upper illustration	D 9
12	3	- Injection signal (t_i) (Ignition oscilloscope special input) Start engine	4	Is there t_i signal? See lower illustration	D 13



A6

Rapid diagnosis chart

Alfa Romeo



A7

Rapid diagnosis chart

Alfa Romeo



Rapid diagnosis chart (continued)

Test step	Switch position		Component being tested, explanations (all measurements to ground)	Connection on 15-pin plug	Test specifications	Coordinate
	V	Ω				
13	4	-	Only on Alfa 75 with LE-Jetr., code: 8.181 Motronic, code: 8.89, 7.89, 9.91, 8.85, 7.85, 9.85 Tank sensor: (Voltages with "ignition on") Tank full Tank 3/4 full Tank 1/2 full Tank 1/4 full Tank on reserve Tank empty	5	approx. 0.5 V approx. 1.0 V approx. 1.5 V approx. 2.3 V approx. 2.5 V approx. 2.7 V	D 15
14	4	-	only on Alfa 75 with LE-Jetr., code:8.181 Motronic code: 8.89, 7.89, 9.91, 8.85, 7.85, 9.85. Voltage stabilizing for tank clock (plug on tank sensor pulled):	5	4.7 - 5.3 V	D 20
15	5	-	Voltage supply for TC via term. 15 (ignition on).	6	Battery voltage	D 23
16	6	-	Outside temperature sensor: voltage measurement with "ignition on" and ambient temperature approx. +20°C	9	approx 1.7 V	E 1

A8

Rapid diagnosis chart

Alfa Romeo



A9

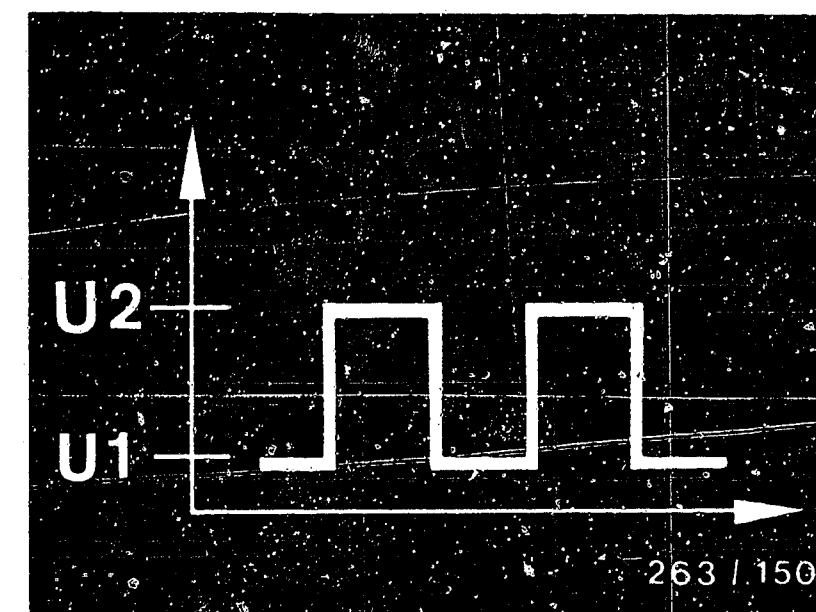
Rapid diagnosis chart

Alfa Romeo



Rapid diagnosis chart (continued)

Test step	Switch position		Component being tested, explanations (all measurements to ground)	Connection on 15-pin plug	Test specifications	Coordinate
	V	Ω				
17	7	-	TC illumination (running light on, operate instrument-illumination regulator)	10	Battery voltage	E 3
18	8	-	Only on Alfa 75 with LE-Jetr., code: 8.81, 7.184, L-Jetr., code: 9.72 Carburetor, code: 8.56, 7.56, 9.10 Motronic, code: 8.88, 8.84, 7.88, 7.84, 9.90, 9.84 Encoding cable 2 pin 7 → pin 1 Engine running in idle	7	> 3 V	E 5
19	9	-	Does not apply to Alfa 75 with carburetor Motronic, code: 8.84, 8.85, 7.84, 7.85, 9.84, 9.85 Encoding cable 3 pin 11 → pin 1 Engine running in idle	11	≥ 3 V	E 7
20	10	-	Does not apply to Alfa 75 with Motronic code: 8.88, 8.84, 8.89, 7.88, 7.89, 7.84, 9.91, 9.90, 9.84, Encoding cable 4 Pin 12 → pin 1 Engine running in idle	12	$U_2 - U_1 \geq 3$ V see illustration	E 9
21	11	-	Does not apply to Alfa 75 with Motronic, code: 7.85, 8.85, 9.85, 9.88 Encoding cable 5 pin 13 → pin 1 Engine running in idle	13	$U_2 - U_1 \geq 3$ V see illustration	E 11



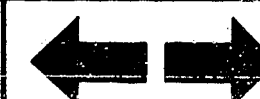
A10

Rapid diagnosis chart
Alfa Romeo



A11

Rapid diagnosis chart
Alfa Romeo



Rapid diagnosis chart (continued)

Test step	Switch position		Component being tested, explanations (all measurements to ground)	Connection on 15-pin plug	Test specifications	Coordinate
	V	Ω				
22	12	-	Only on Alfa 75 with LE-Jetr., code:8.181 Motronic, code: 8.85, 8.89, 7.85, 7.89, 9.91, 9.85 Voltage stabilization for tank clock (plug on tank sensor separated for this).	14	Battery voltage	E 13
23	12	-	Does not apply to Alfa 75 with (same as test step 22) (voltages with "ignition on") Tank full Tank 3/4 full Tank 1/2 full Tank 1/4 full Tank on reserve Tank empty Plug on tank sensor connected.	14	approx. 1.0 V approx. 3.5 V approx. 5.3 V approx. 6.8 V approx. 7.0 V approx. 7.5 V	E17

A12

Rapid diagnosis chart

Alfa Romeo



A13

Rapid diagnosis chart

Alfa Romeo



3. General introduction

As of September 1985, Alfa is supplying the Alfa 75 model (successor to Giulietta) with a trip computer (TC).

BOSCH components are:

TC with activation and evaluation electronics and keyboard

Outside temperature sensor. NTC resistor in holder

Control unit for distance-pulse adaptation in conjunction with TC 0 263 001 030

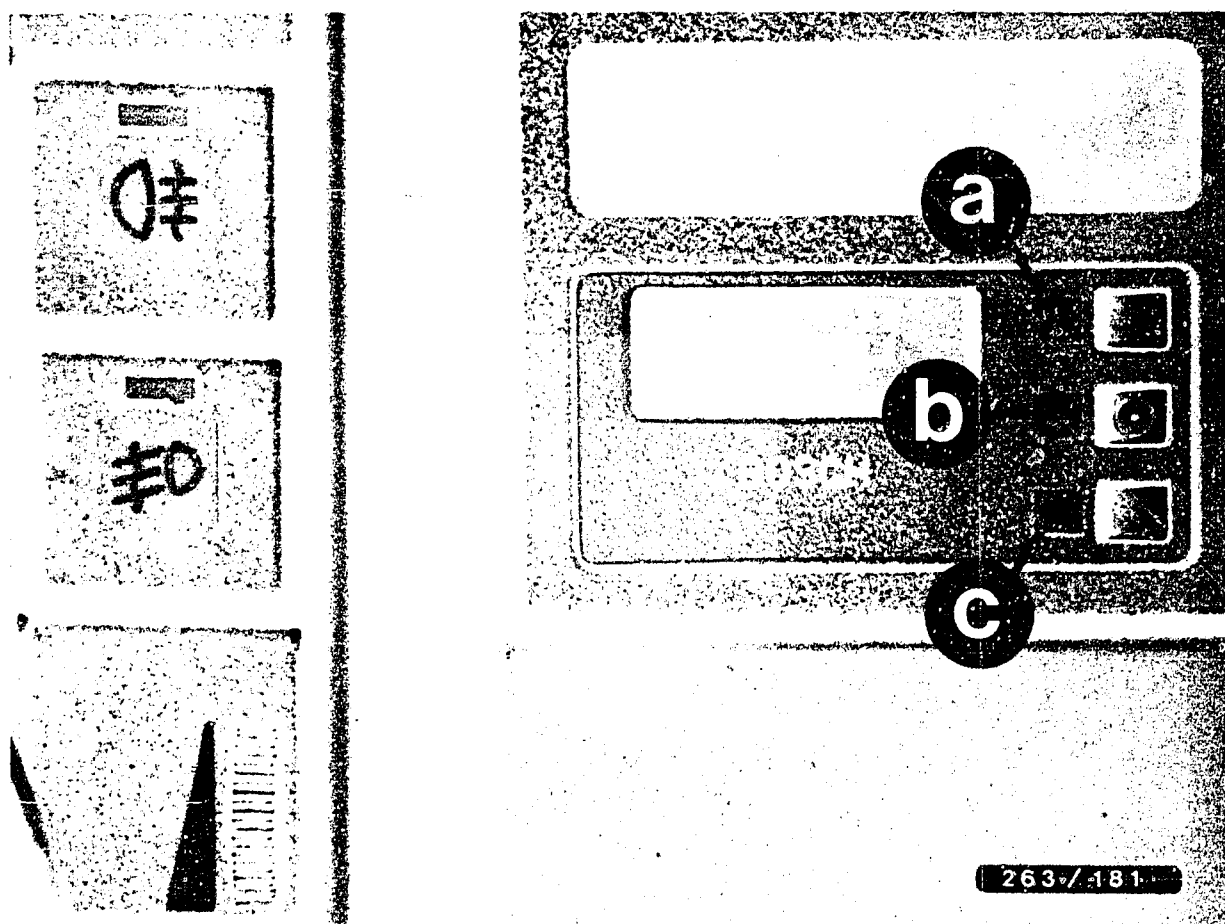
NON-BOSCH components are:

Fuel-consumption sensor (only on carburetor vehicles)

Distance-travelled frequency sensor

Tank sensor





The following functions can be called up by means of the keyboard:

Key a

Key for clearing function
Control of stopwatch
Hours-Minutes correction

Key b

Priority key for time

Key c, function selection:

Instantaneous consumption
ave. consumption
ave. speed
Range of tank (miles to empty)
Stopwatch
Outside temperature

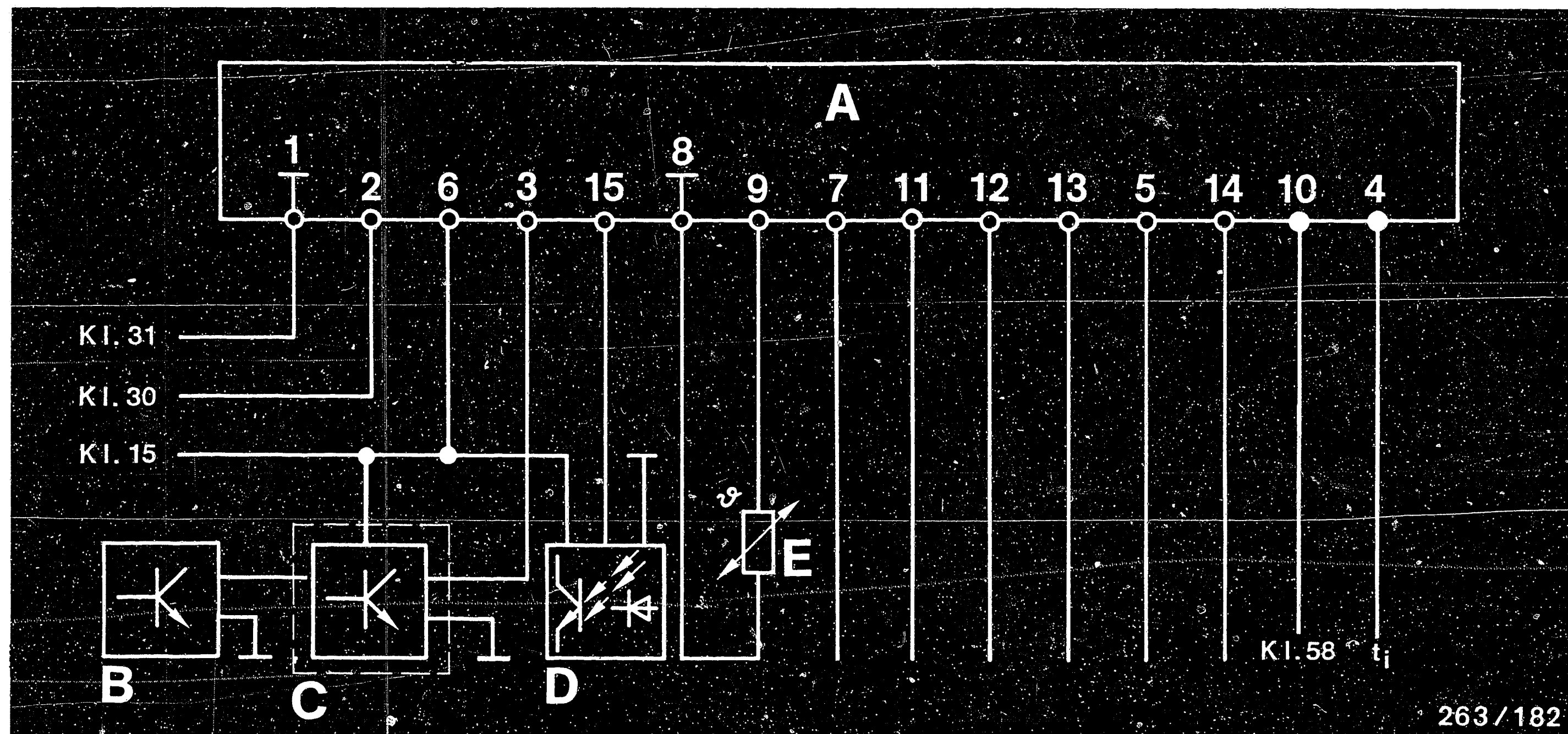


The following signals are used as measured quantities:

1. Resistance of NTC resistor in temperature sensor (Bosch)
2. Duration of injection t_i of LE-Jetronic
3. Speed signal from displacement sensor (from Alfa Romeo)
4. Tank sender voltage (from Alfa Romeo)
5. Consumption signal from fuel-consumption sensor (NON-BOSCH) on carbureted vehicles

The timer functions for clock and stopwatch are generated internally in the trip computer. To calculate the functions of average speed and stopwatch, they are processed together with other signals in the trip computer.





1 = Vehicle ground term. 31
 2 = Battery voltage term. 30
 3 = Displacement sensor
 4 = Injection signal t_i
 5 = Tank sender voltage 5 V
 6 = Terminal 15
 7 = Code 2
 8 = Outside temperature sensor (ground)

9 = Outside temperature sensor
 10 = Light term. 58
 11 = Code 3
 12 = Code 4
 13 = Code 5
 14 = Tank sender voltage 12 V
 15 = Auxiliary voltage for fuel-consumption sensor

A = TC
 B = Distance sensor
 C = Distance-pulse adaptation control unit in conjunction with TC 0 263 001 030
 D = Fuel-consumption sensor
 E = Outside temperature sensor

4. Terminal diagram (terminal assignment) of trip computer

A17

Terminal diagram
Alfa Romeo



A18

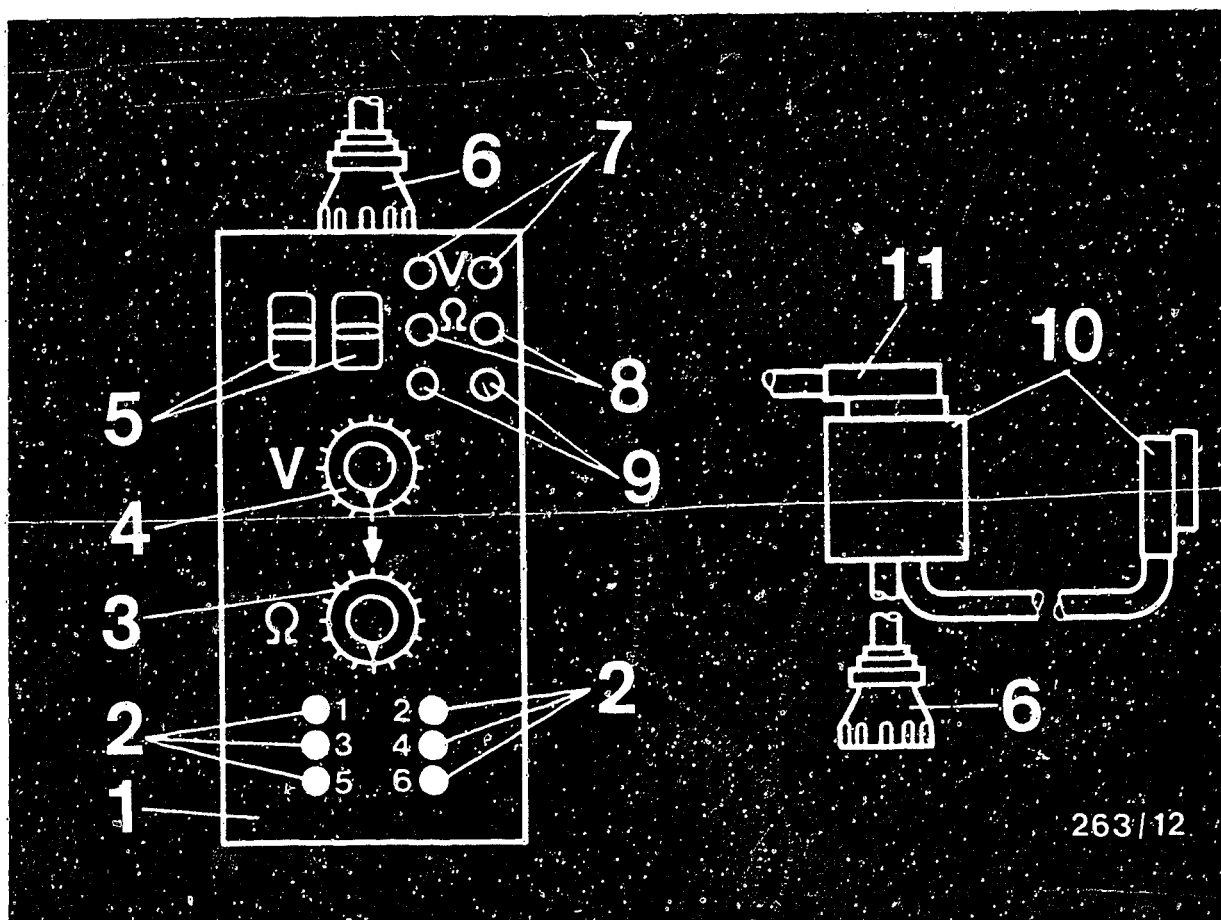
Terminal diagram
Alfa Romeo



5. Test equipment

Universal test adapter	0 684 101 801
Adapter lead	KDES 0004
Motortester e.g. MOT 201	0 684 000 201
Multimeter	Commercially available

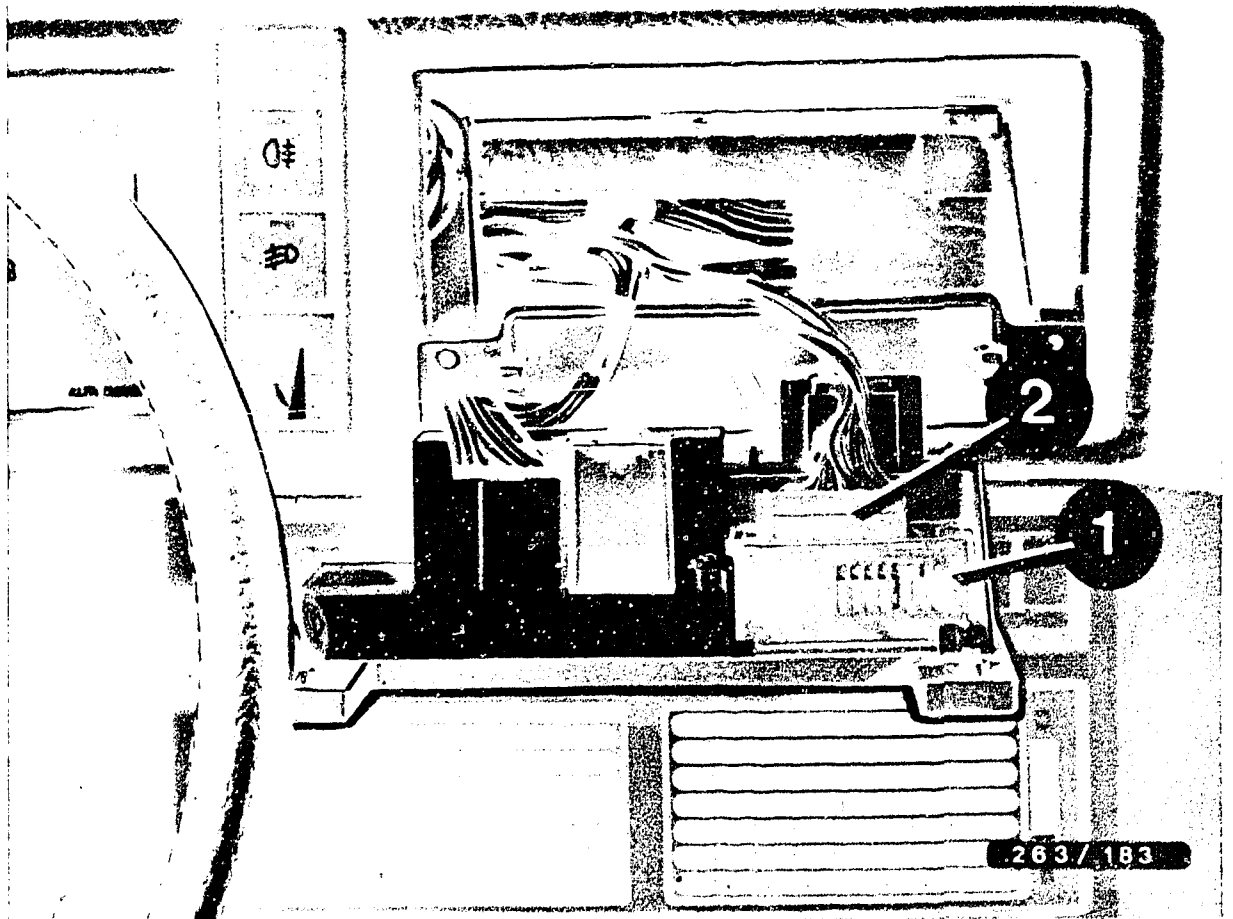




263/12

- 1 = Universal test adapter 0 684 101 801
- 2 = Simulation keyboard
- 3 = Program switch for resistance measurements
- 4 = Program switch for voltage measurements
- 5 = Measuring sockets for special input from Motortester
- 6 = 63-pole plug-in connection for adapter lead
- 7 = Measuring sockets for voltage measurement
- 8 = Measuring sockets for resistance measurements
- 9 = Sockets for special functions (not used yet)
- 10 = Adapter lead KDES 0004 with 15-pole plug
- 11 = 15-pole plug from vehicle wiring harness

5.1 Universal test adapter with adapter lead KDES 0004



- 1 = Trip computer
- 2 = Plug connector

5.2 Connection of adapter lead KDES 0004

Disconnect plug from trip computer and connect to adapter lead KDES 0004.

Connect 15-pin plug of adapter lead KDES 0004 to trip computer.



6. Installation position of components and instructions for removal

The TC is located in the dashboard in the place of the digital clock, to the right of the instrument cluster (see upper illustration)

Removal:

The TC is mounted in the frame of the control unit with 2 mountings.

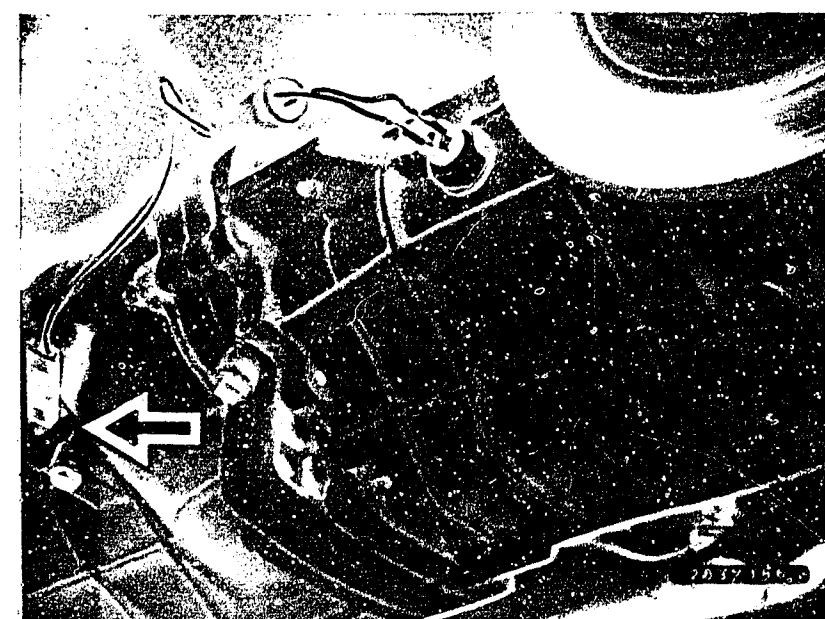
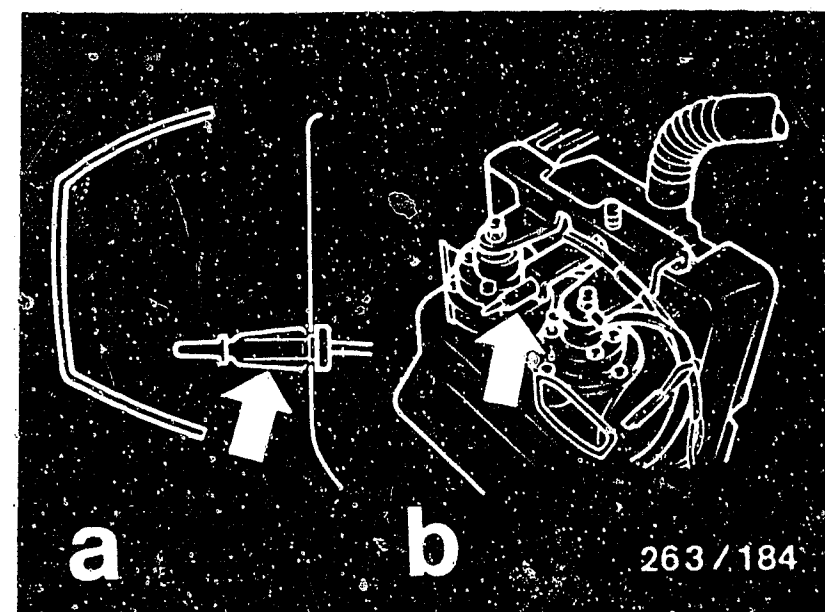
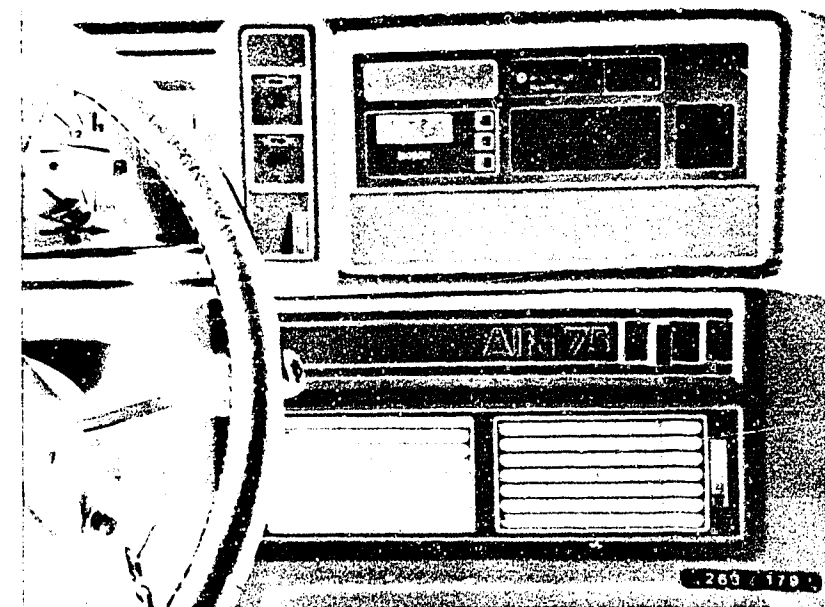
The outside temperature sensor is located on the Alfa 75 2.0 l on the inside of the bumper on a retaining bracket which is fastened to the fluid reservoir for the windshild and headlamp washing system (middle illustration, b, arrow).

On the Alfa 75 2.5 l, the outside temperature sensor is located in front of the right front wheel underneath the headlamp behind the bumper (middle illustration, a, arrow).

Removal:

Push the two spring lugs together and pull outside temperature sensor out towards the rear.

The distance sensor is located on the transmission (on rear axle) on the left in the direction of travel (see lower illustration, arrow).



A22

Installation position of components

Alfa Romeo

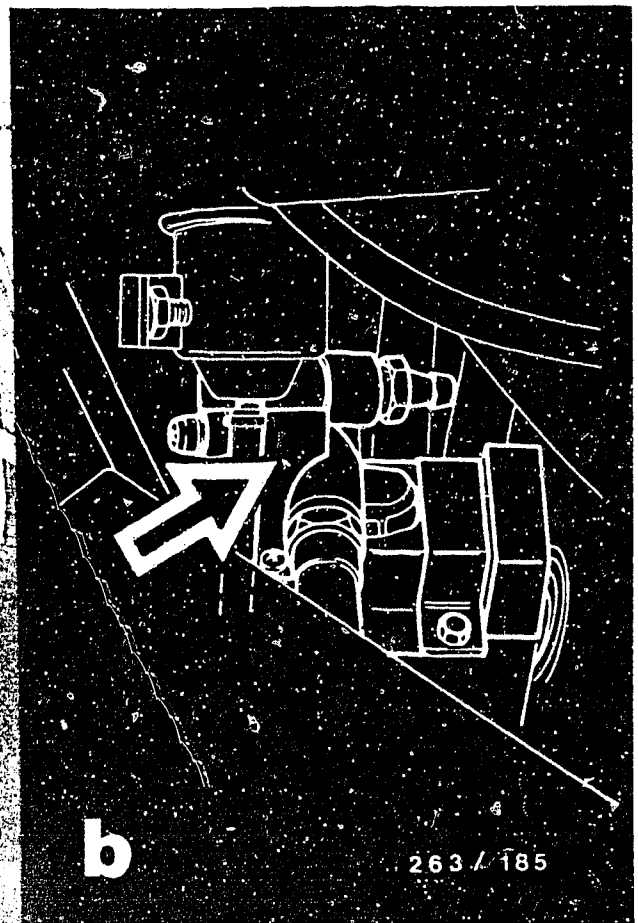
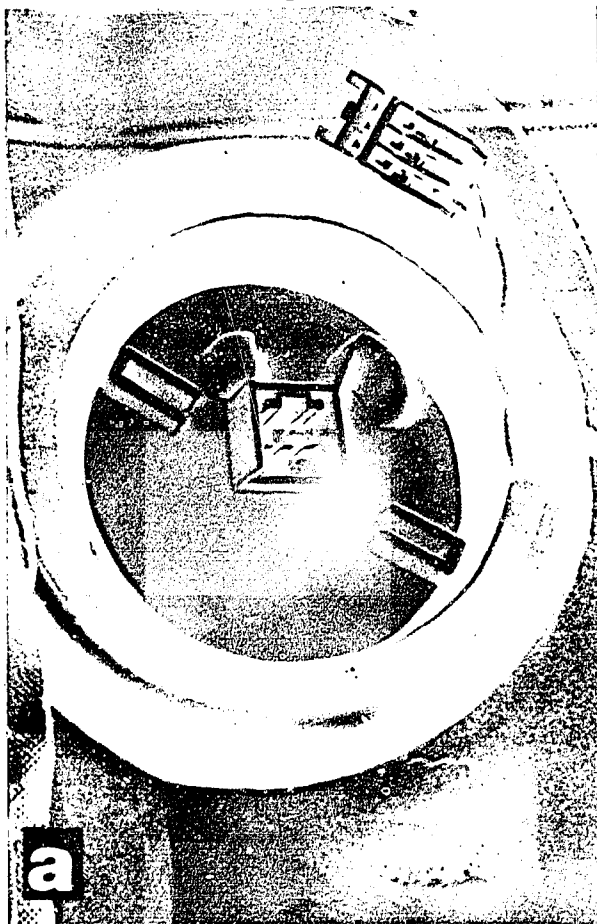


A23

Installation position of components

Alfa Romeo





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The tank sensor (fig. a) is let into the tank in the luggage compartment.

The fuel-consumption sensor is located in the engine compartment in the fuel line (fig. b, arrow).



7. Trouble-shooting

Trouble-shooting comprises:

- Functional test of trip computer
- Trouble-shooting according to fault symptoms (customer complaint)
- Removal of trip computer
- Setting the time
- Setting the range (miles to empty)
- Test with universal test adapter



Requirements for testing

- Check the customer complaint.
(Check operation of trip computer according to vehicle owner manual; see Coordinates B 3 - B 6 for extract).
- Electrical system (fuses, battery voltage O.K.)
- When working on the fuel system, observe accident prevention regulations as well as environmental and health regulations.
- Check all functions with the vehicle stationary and before removing the trip computer.
- Passenger compartment temperature $\geq 0^{\circ}\text{C}$.
- Original transmission/differential installed (otherwise change of distance per number of revolutions).
- Original tires (14") mounted (changed rolling circumference means change of distance per number of revolutions). Observe air pressure.
- Engine and injection system not tuned (allocation of input signals to fixed computer program of trip computer may change. Trip computer then shows incorrect readings).



7.1 Functional test

7.1.1 General

With the ignition off, the time of day is indicated; all control keys are inoperative. Display illumination is off (see picture 1a). Immediately after switching on the ignition, the display is suppressed for approx. 1 sec.

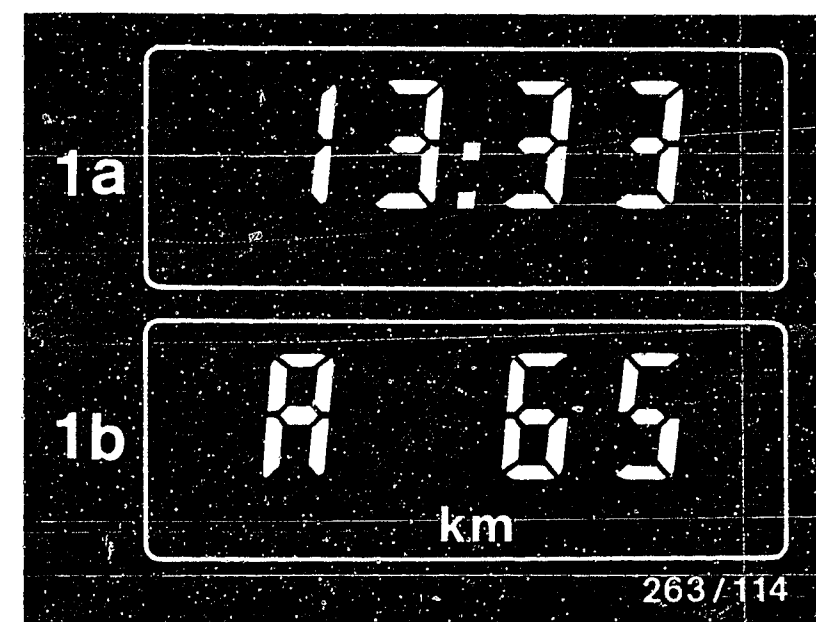
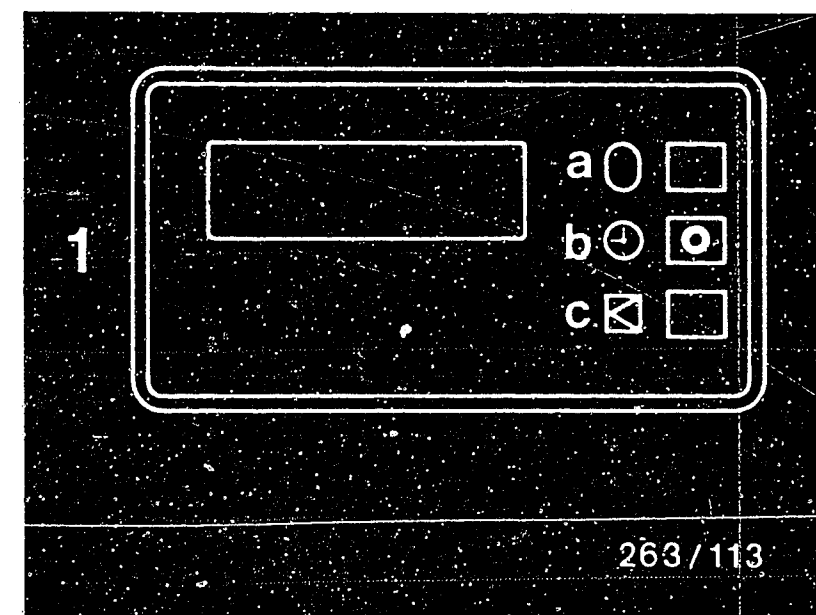
With the ignition on, the time-of-day display remains until key "c" is actuated. Exception: miles-to-empty warning which has priority (see picture 1b, 2a).

With ignition and lights on, a high illumination level is set; with driving lights additionally on, a lower illumination level is set.

7.1.2 Function selection with key "c" (see picture 1)

With the ignition on, brief pressing of key "c" causes the functions to appear separately in the following order:

a) instantaneous consumption (see picture 2b).



B3

Trouble-shooting (functional test)

Alfa Romeo



B4

Trouble-shooting (functional test)

Alfa Romeo



Function selection with key "c" (continued)

- b) Average consumption (see picture 2c)
- c) Average speed (see picture 2d)
- d) Range of tank (miles to empty)
- e) Stopwatch
- f) Outside temperature
- g) Instantaneous consumption
etc.

Note:

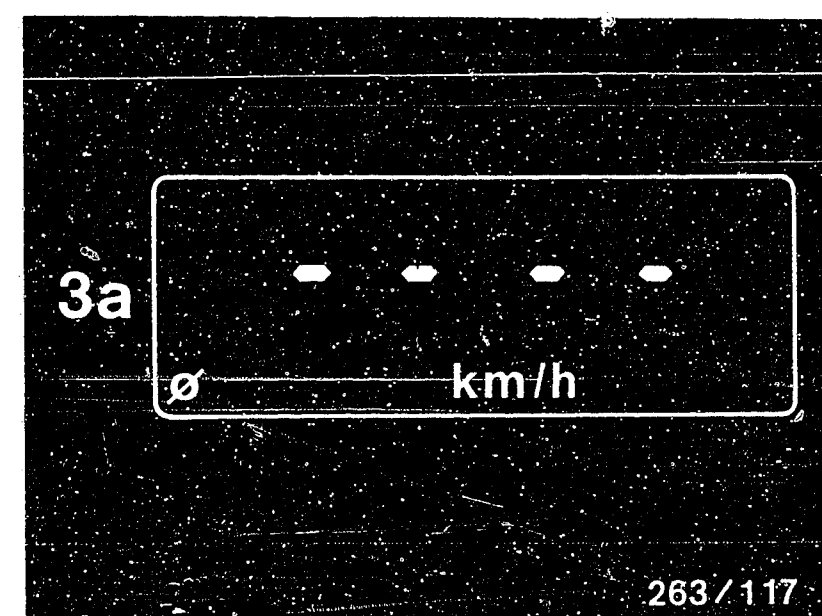
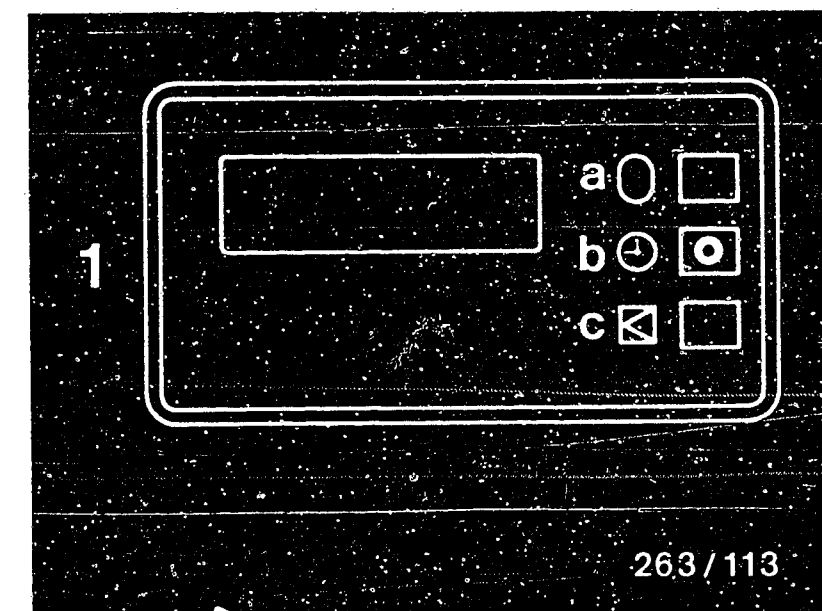
If pressed longer (≥ 1 s), this causes automatic rollover of functions.

7.1.3 Resetting of function / Control of stopwatch with key "a" (see picture a)

If key "a" is pressed for more than 1 sec in "average speed" mode, this causes the memory of the displayed function to be reset and this function is calculated anew. When calculation starts anew, 4 horizontal bars (see picture 3a) appear for 1 sec.

If key "a" is pressed in "stopwatch" mode, this causes the stopwatch to be operated in the following sequence:

Stop - Reset - Start - Stop etc.



7.1.4 Priority for time of day, key "b" (see picture 1)

By pressing key "b", it is possible at all times to exit another function and to return to time of day mode (see picture 4a). Subsequent actuation of key "c" causes the display to return to the previous function.

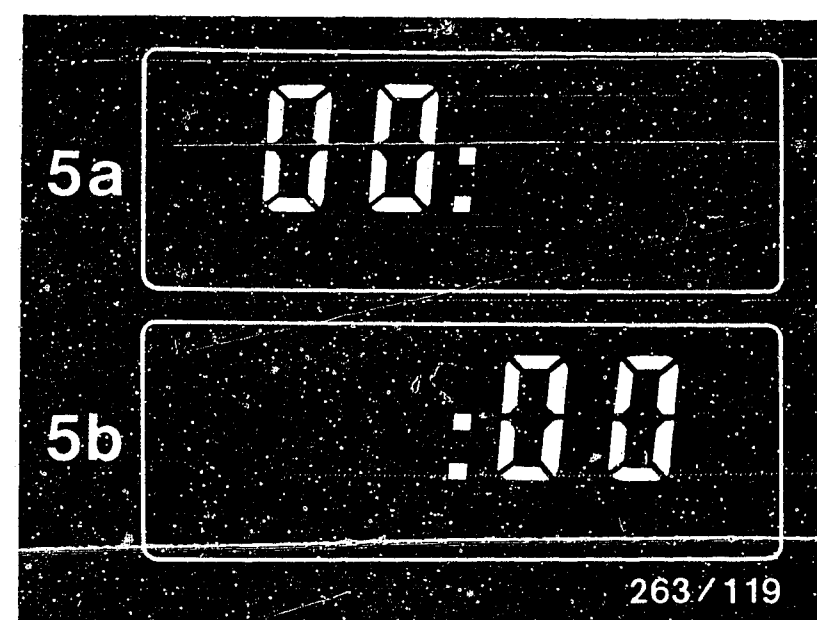
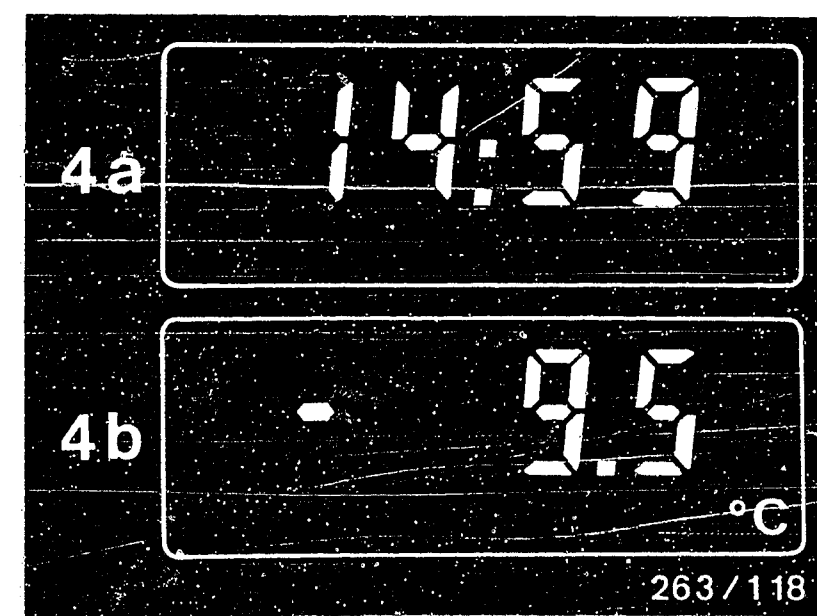
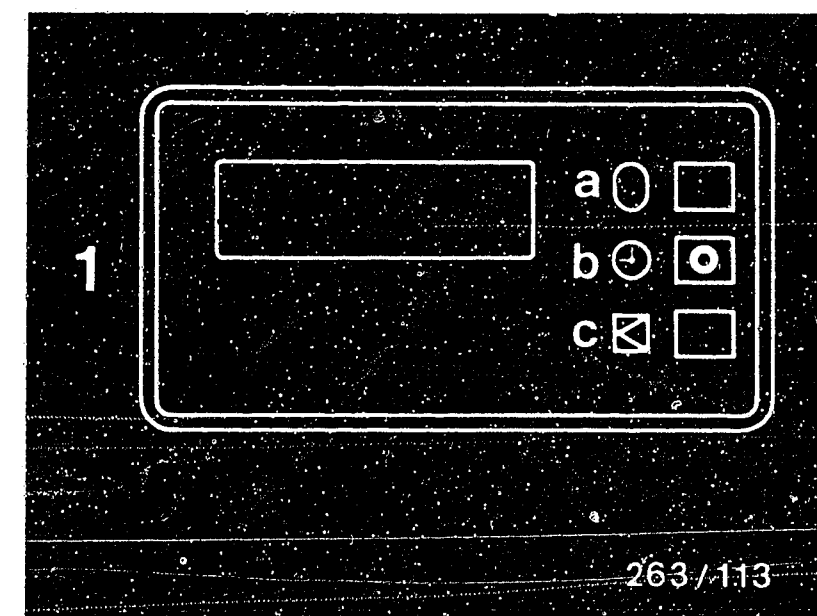
7.1.5 Setting the time with keys "a" and "b"

Trip computer in "time of day" mode, ignition on.

First pressing of key "a" causes switching-off of the minutes display (see picture a). Subsequent brief pressing of key "b" advances the hours display by one unit; pressing for longer causes automatic fast advance. When key "a" is actuated a second time, this switches off the hours display (see picture 5b); setting of minutes with key "b" in same manner as for hours display.

The clock is started by pressing button "c" or "a" and likewise by switching off the ignition.

The dots between hours and minutes do not flash.



B7

Trouble-shooting (functional test)

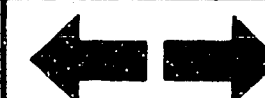
Alfa Romeo



B8

Trouble-shooting (functional test)

Alfa Romeo



7.1.6 Calibration of range of tank with keys "b" and "c" (see top picture)

Assuming that each supplied trip computer is preset at a nominal voltage of the tank sender corresponding to a fuel quantity of 7 l, it is possible to make a further, more accurate calibration which compensates for the tolerances of the tank and of the tank sender.

This calibration is performed as follows:

- Contents of tank must be precisely 7 liters
- Ignition on (not important whether engine running)
- Simultaneously press key "b" and key "c" > 1 sec:
trip computer is in "calibration mode" when 0 km appears on the display.
- By turning the calibration potentiometer (through hole in key "b", see bottom picture), set display to 65...70, corresponding to 7 liters in tank (see picture 6).

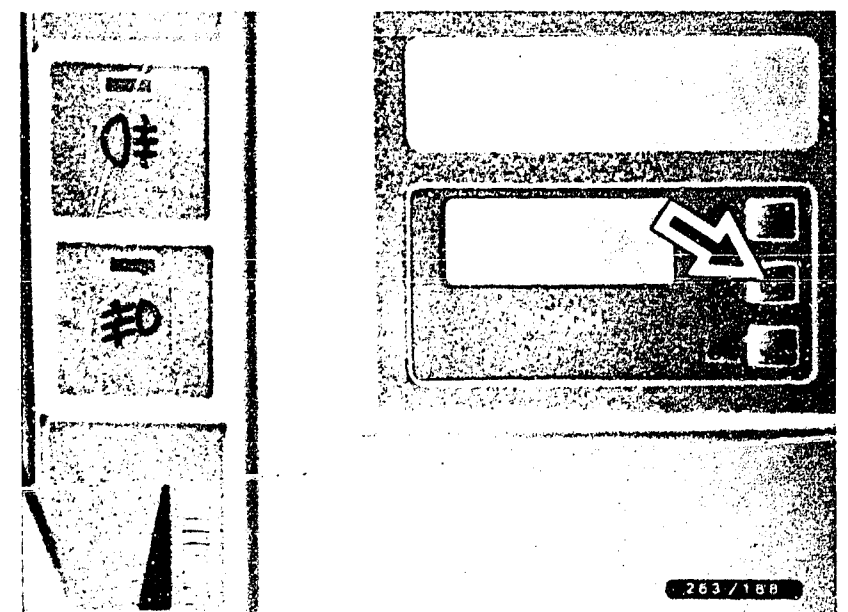
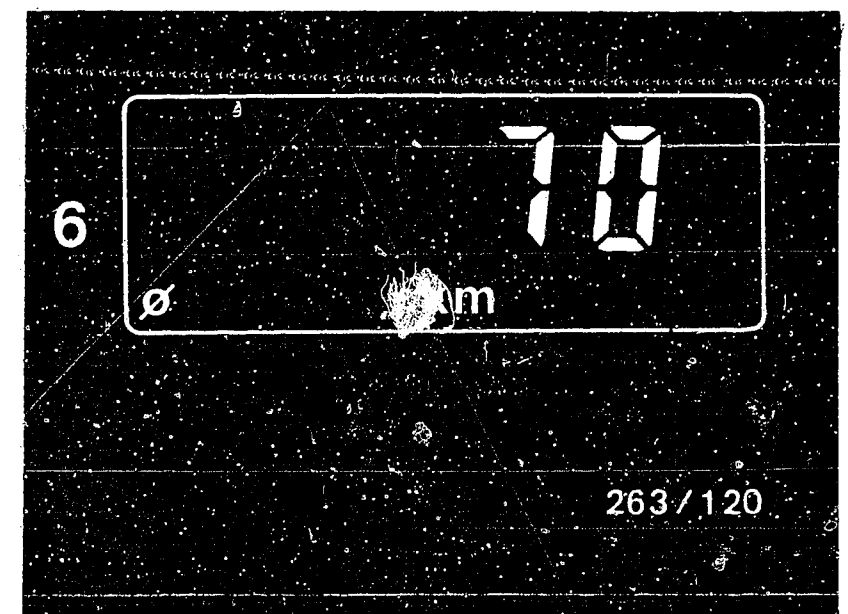
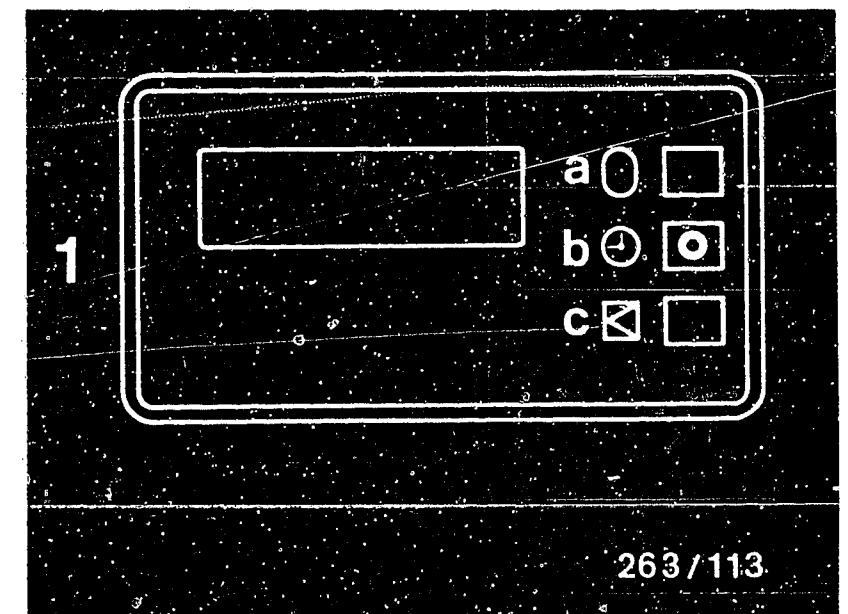
Note :

Potentiometer has a turning angle of max. 270°.

Turn carefully.

If previous range is known, the tank need not be emptied down to 7 l; the previous range can be set straight away at calibration potentiometer (in key "b"). Proceed in the same sequence as if 7 l in tank.

Calibration is completed when, after setting the above value, a different function is selected.



B9

Trouble-shooting (functional test)

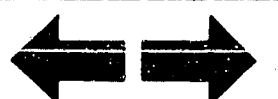
Alfa Romeo



B10

Trouble-shooting (functional test)

Alfa Romeo



7.2 FUNCTIONS

7.2.1 Instantaneous consumption

Dimension changes depending on speed:

Display in l/h at below approx. 20 km/h (see picture 7a)

Display in l/100 km at above approx. 20 km/h (see picture 7b)

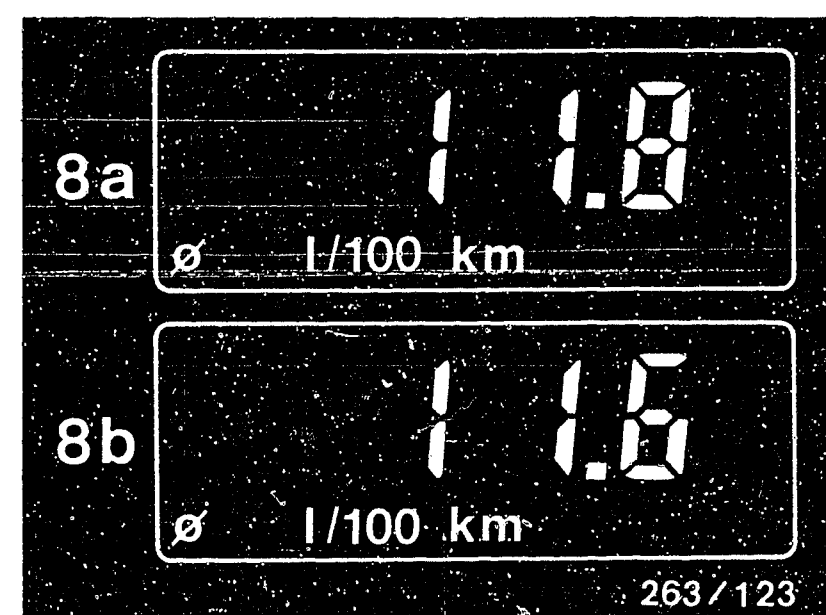
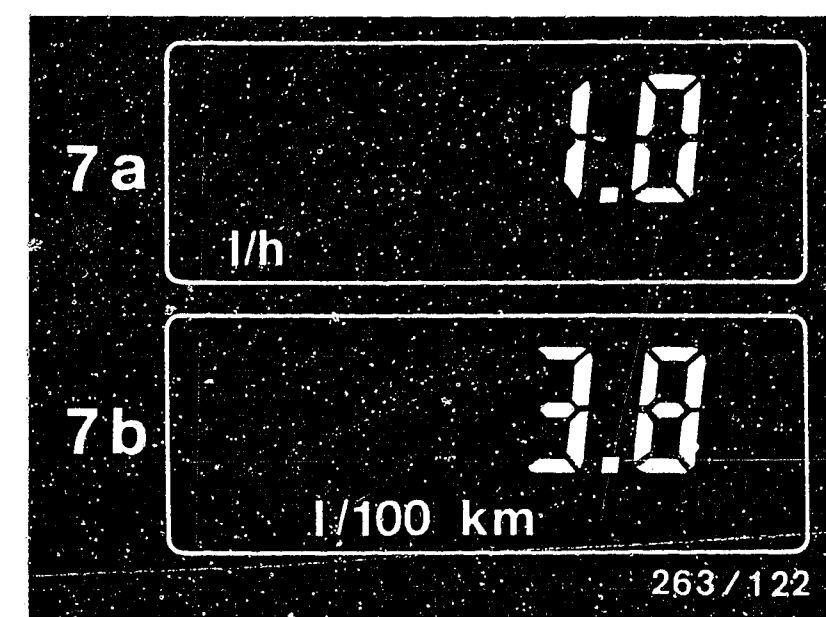
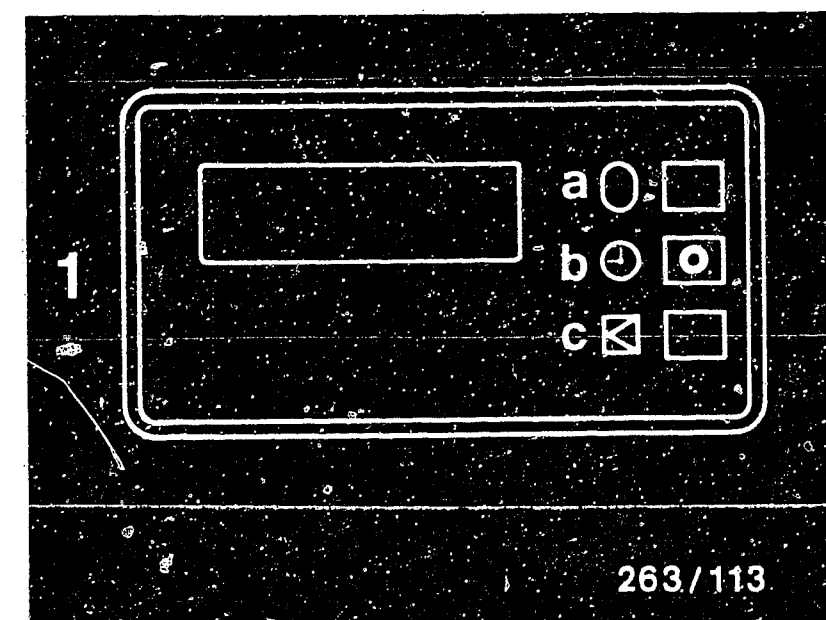
Max. indicated value: 40 l/h

On overrun cutoff the consumption display 0 is obtained in approx. 1 sec.

7.2.2 Average consumption

Display in \emptyset l/100 km

With the engine running and the vehicle stationary, the display shows the last indicated average value for when the vehicle was moving (see picture 8a). Immediately after the vehicle has been stopped, the reading may change once again due to the software as the last distance pulse is measured (see picture 8b).



B11

Trouble-shooting (functional test)

Alfa Romeo



B12

Trouble-shooting (functional test)

Alfa Romeo



7.2.3 Average speed

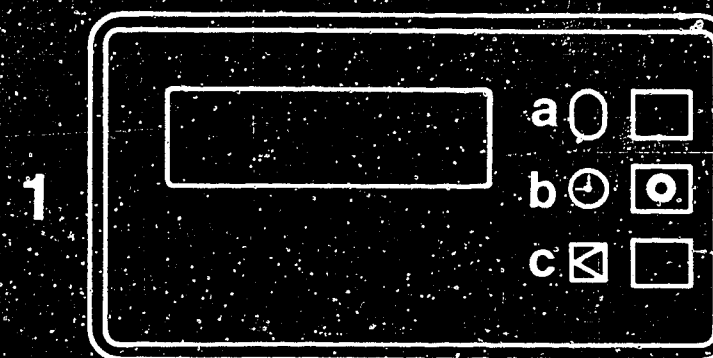
The calculation of the average speed can be re-started at any time - e.g. at the start of a journey - by pressing key "a" (picture 1) for > 1 sec. After resetting, the display ---- appears for 1 sec (see picture 9a). Interruptions in the journey with the ignition off are not included.

Display in ave. km/h (see picture 9b).

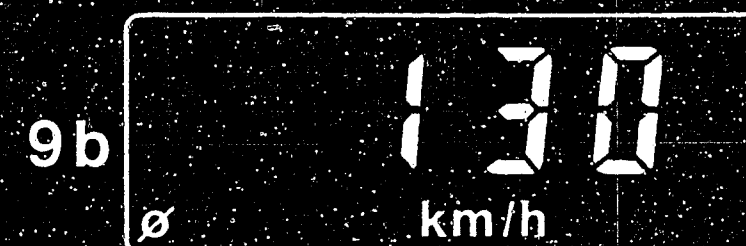
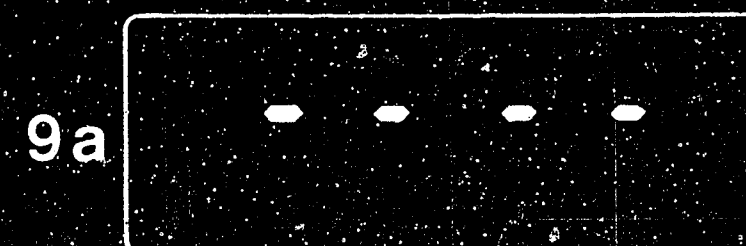
7.2.4 Range of tank (miles to empty) with tank contents greater than or equal to 46 - 6 l

46 l is the max. tank contents and 6 l the quantity of fuel which, starting out from a full tank, must be consumed for the tank sender to operate correctly.

If the tank contents are > 40 l, the range is indicated in the form H ... (see picture 10) whereby ... is the range which is calculated from a tank of 46 - 6 l and the calculated consumption over the last approx. 32 km at an average speed = approx. 60 km/h.



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B13

Trouble-shooting (functional test)

Alfa Romeo



B14

Trouble-shooting (functional test)

Alfa Romeo



7.2.4.1 Range of tank (miles to empty) with tank contents between 40 and 7 l

The range is calculated from the instantaneous tank level and the calculated consumption over the last approx. 32 km, at an average speed = approx. 60 km/h.

After refueling, there is an automatic correction of the range of the tank within approx. 10 min. The changed range can be made to appear immediately on the display by pressing key "a" for > 1 sec. In this case, 4 bars (see picture 11a) appear for approx. 3 sec, after which the changed range is indicated (see picture 11b).

Display in km.

7.2.4.2 Range of tank (miles to empty) with tank contents between 7 and 3 l

The display switches automatically to "range of tank" if the tank contents are less than 7 l.

Display is in the form A ... whereby ... is the calculated range in km (see picture 12a).

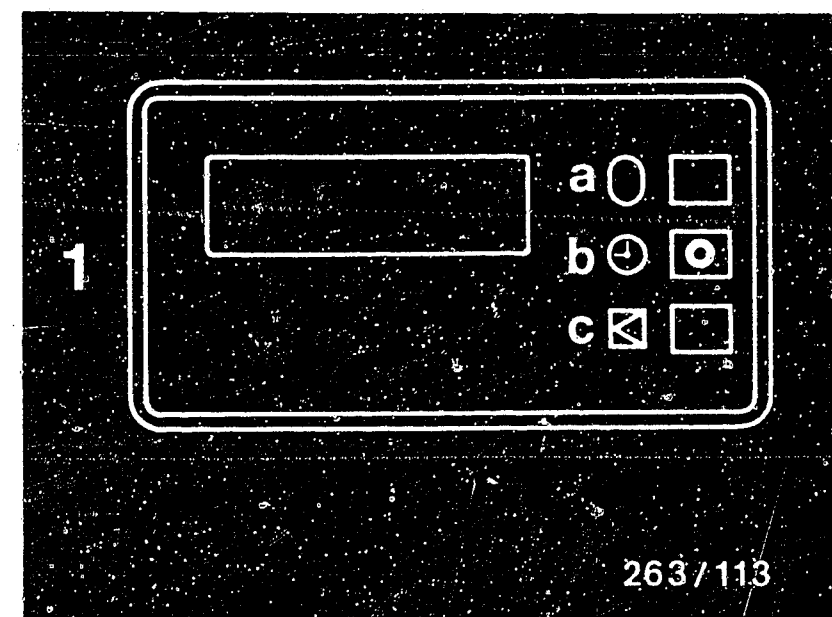
Display flashes.

This warning function is switched off by selecting a different function.

There is a renewed automatic change-over to "range of tank" (miles to empty) when the ignition is switched on again after having previously been switched off, i.e. after each interruption in the journey with the ignition off.

7.2.4.3 Range of tank (miles to empty) with tank contents less than 3 l

There is no longer a numerical indication of the remaining range on the tank. Display flashes with AAAA (see picture 12b).



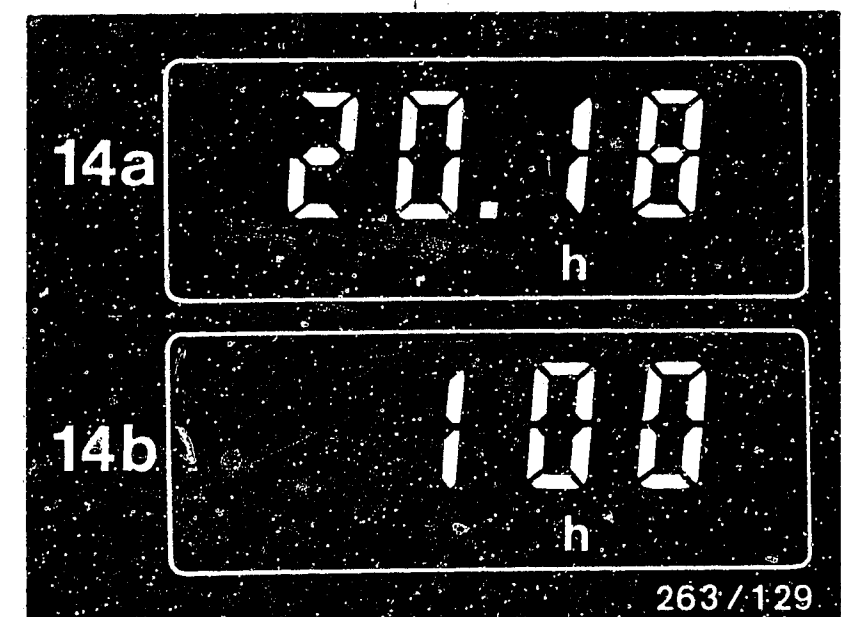
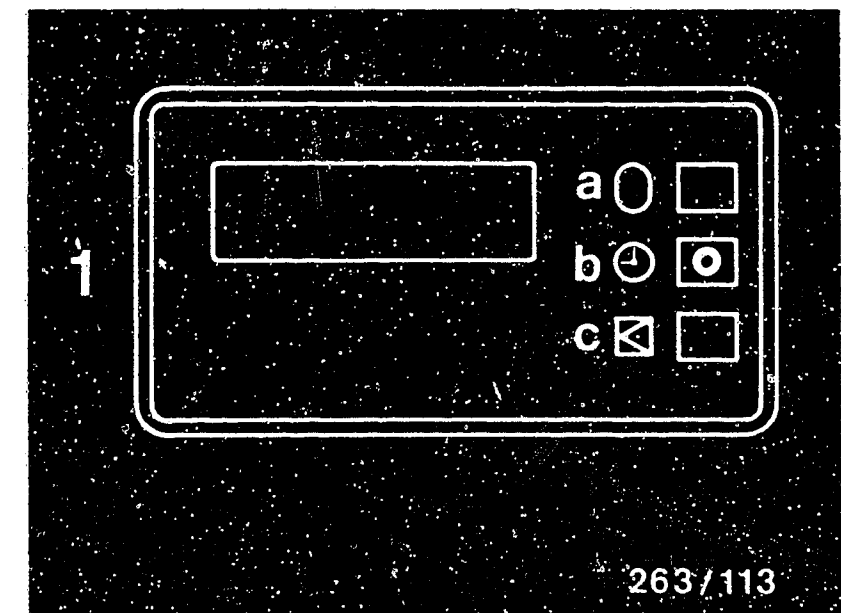
7.2.5 Stopwatch

Zero - Start - Stop - Zero ... by pressing key "a".

Stopwatch display:

Time	indicated figures signify				
up to 10 min	min	sec	sec	1/10 sec	(see picture 13a)
up to 60 min	min	min	sec	sec	(see picture 13b)
up to 100 h	hr	hr	min	min	(see picture 14a)
as of 100 h	hr	hr	hr	hr	(see picture 14b)

Stopwatch is stopped with ignition off.



B17

Trouble-shooting (functional test)

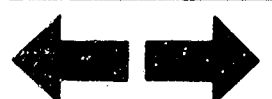
Alfa Romeo



B18

Trouble-shooting (functional test)

Alfa Romeo



7.2.6 Outside temperature

Display in °C in steps of 0.5° C (see picture 15a). If temperature falls below the 0°C limit, a minus sign (-) appears in front of the figures (see picture 15b).

7.3 TEST MODE

In addition to the agreed functions, it is possible to call up 3 additional measuring/test functions. This is done by simultaneously pressing the 3 keys with the ignition on.
The 3 functions appear sequentially in the following order.

7.3.1 Display of program code

The 1st simultaneous pressing of the 3 keys > 1 sec causes the program code (e.g. 6.14) to be indicated (see picture 16a).

1st digit = ROM No.

2nd 3rd and 4th digits = Encoding of code pins.

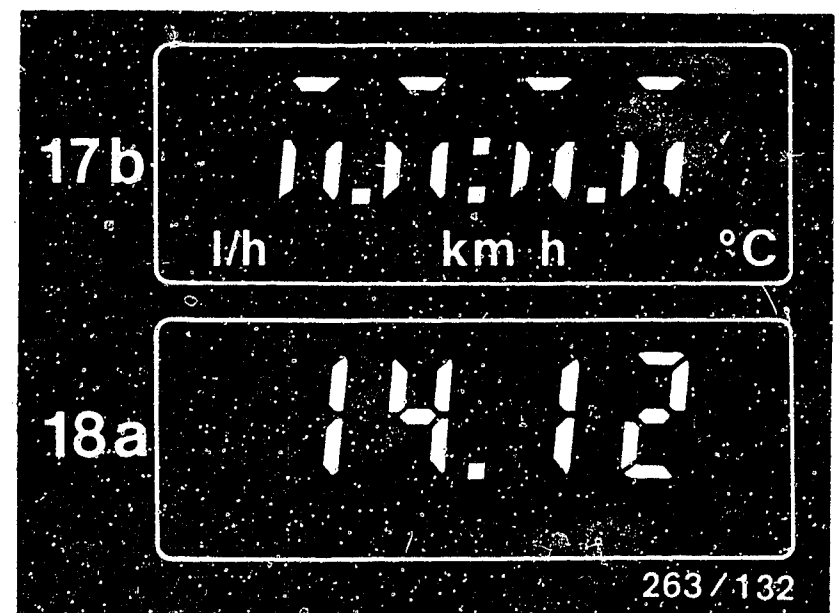
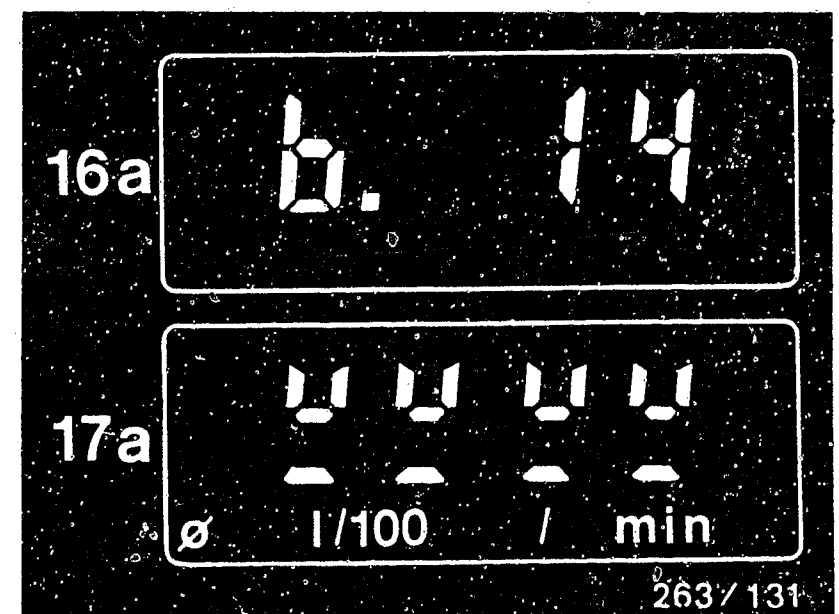
7.3.2 Display test

The 2nd simultaneous pressing of the 3 keys > 1 sec causes all segments of the display to be tested alternately (see picture 17a, 17b).

7.3.3 Indication of supply voltage

The 3rd simultaneous pressing of the 3 keys > 1 sec causes the supply voltage to be indicated (see picture 18a).

The test mode is exited by selecting any function.



7.4 Trouble-shooting chart according to fault symptoms

The fault symptoms listed below may be due to one or more faults.

Fault symptom (customer complaint)

1. No display on trip computer
2. Time of day incorrectly displayed
3. Time of day only - no other functions possible
4. No display of outside temperature
5. Range of tank (miles to empty) no display or display incorrect
6. Average speed - no display or display incorrect
7. Incomplete figures in display (segments only)
8. Consumption display incorrect
9. Illumination not working
10. Test function not working or showing incorrect values

10. Test function not working or showing incorrect values										<u>Causes of trouble</u>	<u>Testing on Coordinates</u>
●	●									No, or temporarily no battery voltage to trip computer	D5, D3
●	●				●	●			●	Trip computer defective, replace	C1...C4
		●	●	●	●		●		●	No connection at term. 15 or temporarily no voltage	D21
		●		●	●				●	Controls defective, replace trip computer	C1...C4
			●							Connections or outside temperature sensor defective or damaged, encoded, incorrect installation position	E1
				●						Tank sender defective, dent in fuel tank, no voltage at tank sender	C8, C22, D15, E17
				●					●	Battery voltage too low, range-of-tank setting incorrect	D5
				●						Tank sender defective	C8, C22, D15, D17
					●					Displacement sensor defective	D9
				●	●					Pulse converter defective	D9

B21

Trouble-shooting (trouble-shooting chart)

Alfa Romeo



B22

Trouble-shooting (trouble-shooting chart)

Alfa Romeo



Trouble-shooting chart according to fault symptoms (continued)

The fault symptoms listed below may be due to one or more faults.

Fault symptom (customer complaint)

1. No display on trip computer
2. Time of day incorrectly displayed
3. Time of day only - no other functions possible
4. No display of outside temperature
5. Range of tank (miles to empty) no display or display incorrect
6. Average speed - no display or display incorrect
7. Incomplete figures in display (segments only)
8. Figures on display only slightly visible
9. Consumption display incorrect
10. Illumination not working
11. Test function not working or showing incorrect values

											<u>Causes of trouble</u>	<u>Testing on Coordinates</u>
							●				Passenger compartment temperature below minus 10°C (Display too slow) or above + 65°C	-----
				●	●			●			Drive ratio changed? Transmission or rear axle replaced?	-----
				●	●			●			Wheels with different rolling circumference mounted?	-----
					●			●			Tuning work performed on engine/injection system?	-----
								●			Injection signal not O.K.	D 13
				●	●			●		●	Incorrect trip computer (compare with equipment list), incorrect encoding	B 19 C12,C18,C20,E5...E11
									●		Bulb defective	E 3

B23

Trouble-shooting (trouble-shooting chart)

Alfa Romeo

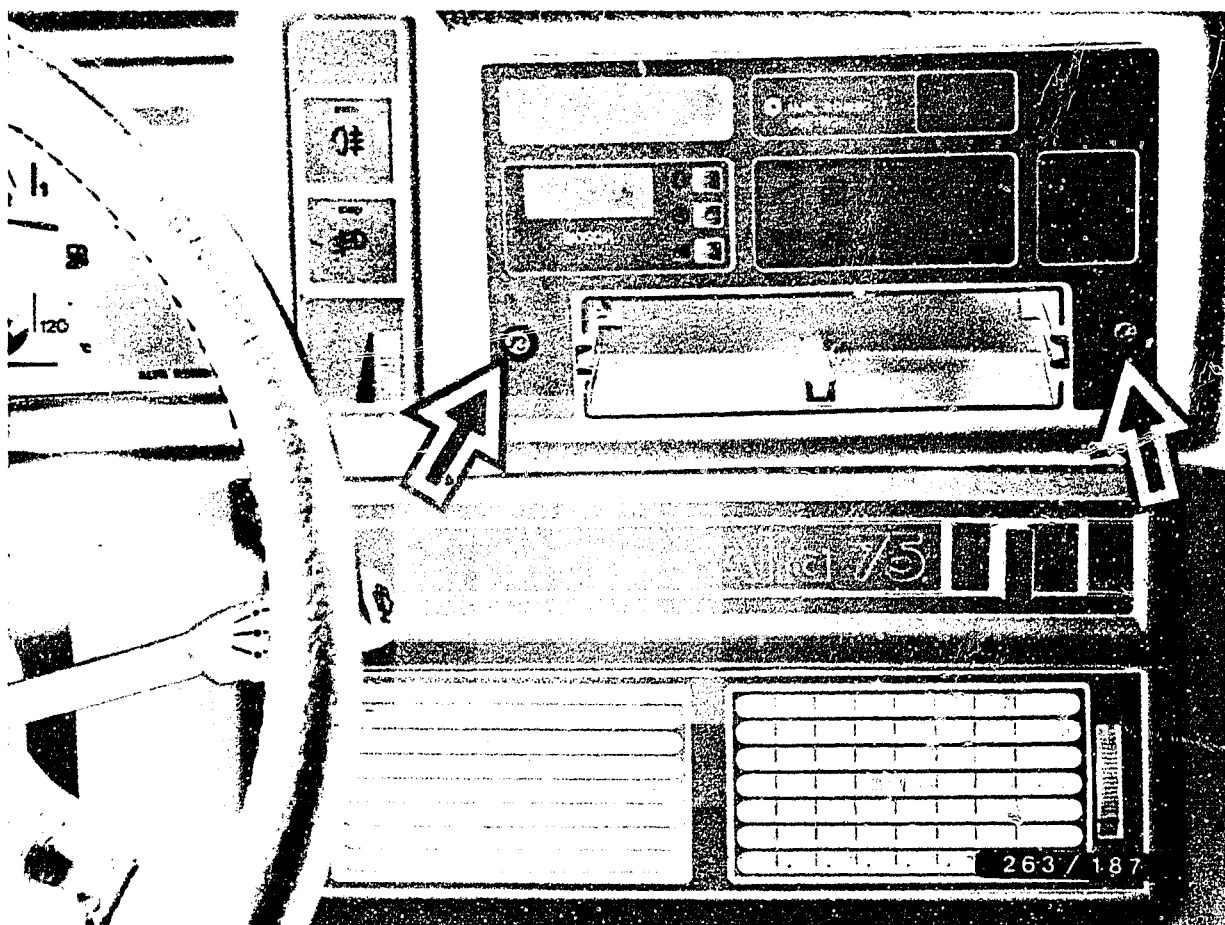


B24

Trouble-shooting (trouble-shooting chart)

Alfa Romeo





7.5 Removing the TC

Remove ashtray. Unscrew two screws (illustration, arrows) and remove indicator-lamp panel from dashboard. Disconnect plug connections. After replacing the TC, the clock time and range must be reset.

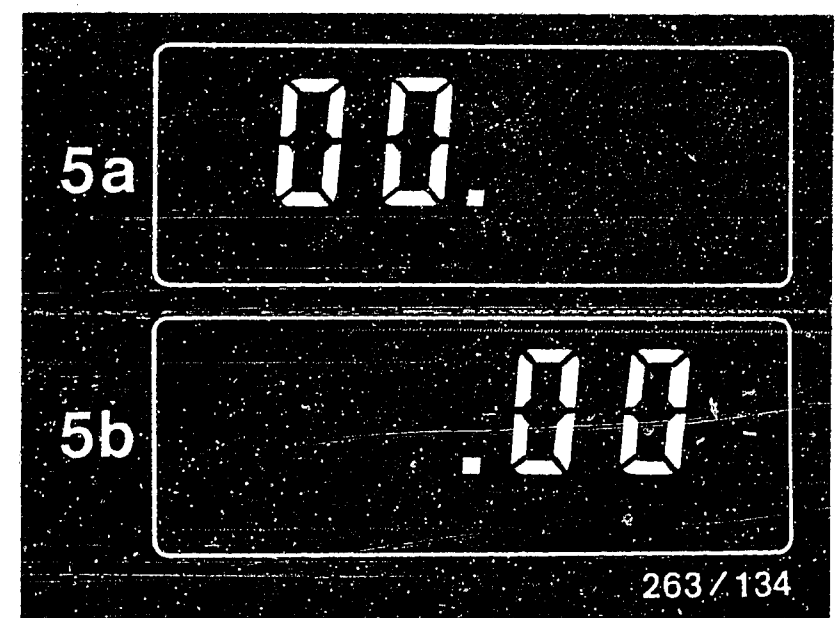
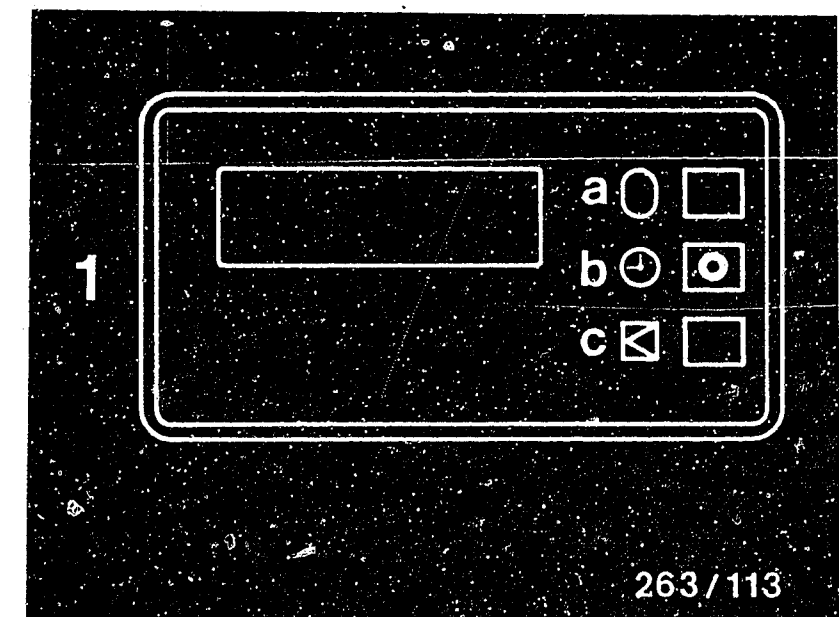


7.5.1 Setting the time with keys "a" and "b" (see top picture)

Trip computer in "time of day" mode, ignition on.
First pressing of key "a" causes switching-off of the minutes display (see picture a). Subsequent brief pressing of key "b" advances the hours display by one unit; pressing for longer causes automatic fast advance. When key "a" is actuated a second time, this switches off the hours display (see picture 5b); setting of minutes with key "b" in same manner as for hours display.

The clock is started by pressing button "c" or "a" and likewise by switching off the ignition.

The dots between hours and minutes do not flash.



7.5.2 Calibration of range of tank with keys "b" and "c" (see top picture)

Assuming that each supplied trip computer is preset at a nominal voltage of the tank sender corresponding to a fuel quantity of 7 l, it is possible to make a further, more accurate calibration which compensates for the tolerances of the tank and of the tank sender.

This calibration is performed as follows:

- Contents of tank must be precisely 7 liters
- Ignition on (not important whether engine running)
- Simultaneously press key "b" and key "c" > 1 sec:
trip computer is in "calibration mode" when 0 km appears on the display.
- By turning the calibration potentiometer (through hole in key "b", see bottom picture), set display to 65...70, corresponding to 7 liters in tank (see picture 6).

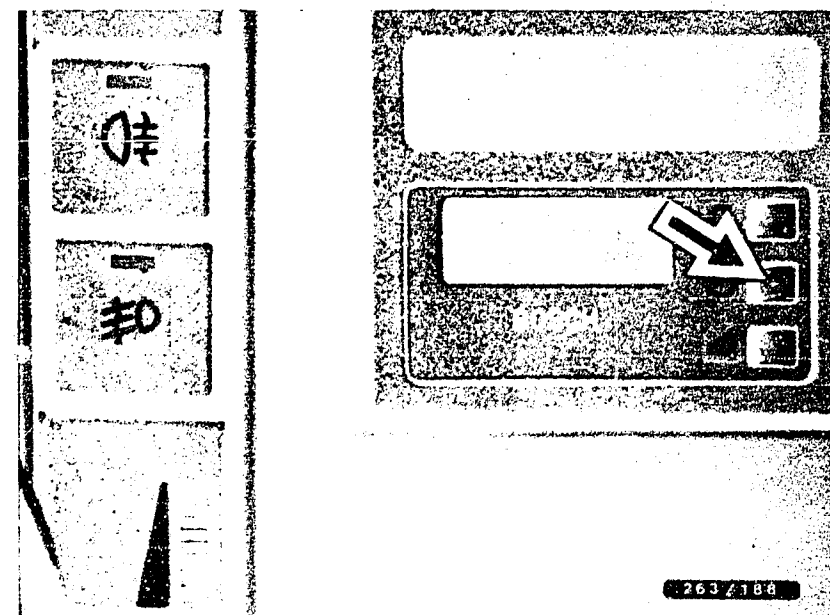
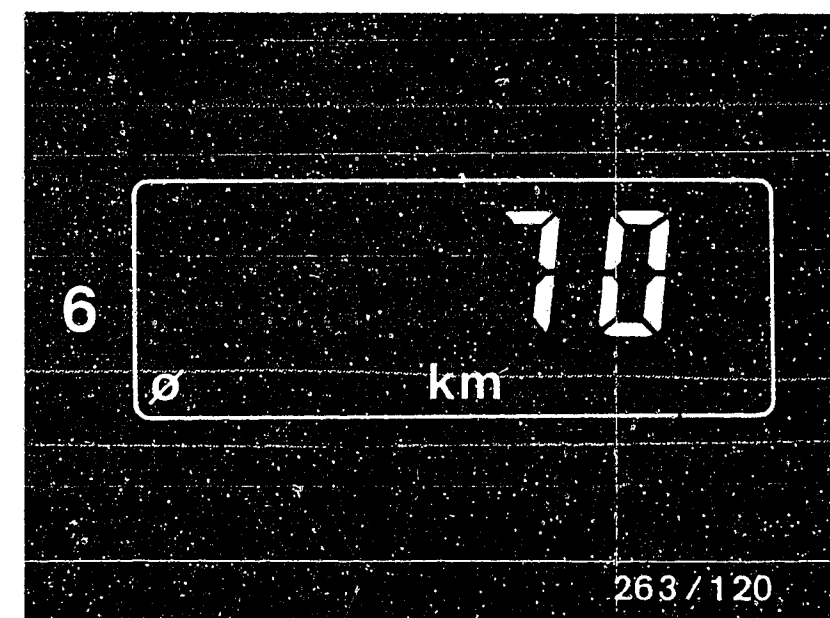
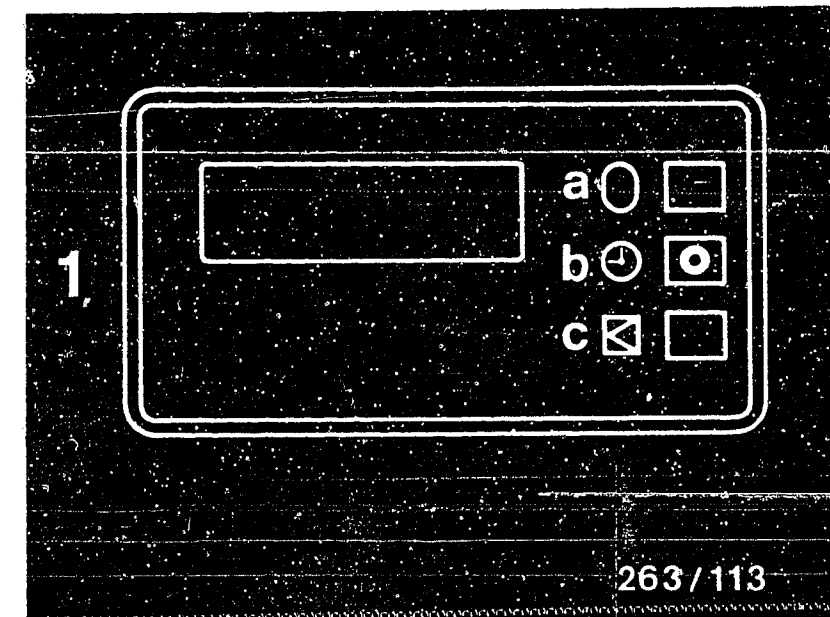
Note :

Potentiometer has a turning angle of max. 270°.

Turn carefully.

If previous range is known, the tank need not be emptied down to 7 l; the previous range can be set straight away at calibration potentiometer (in key "b"). Proceed in the same sequence as if 7 l in tank.

Calibration is completed when, after setting the above value, a different function is selected.



7.6 Testing with universal test adapter

Test step 1:

Component/function

Lead from central ground to TC, pin 1

Operation:

Position

Program switch "V"
Program switch "Ω"
Test key

	↓
	1
	-

Measuring equipment:

Multimeter

Measuring range:

Ω x 1

Connection: See upper illustration.

Instructions:

For this measurement, use only 1 Ω jack on uni-adapter (see illustration)

Operation in vehicle:

Test specifications (reading)

0 ... 10 Ω

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

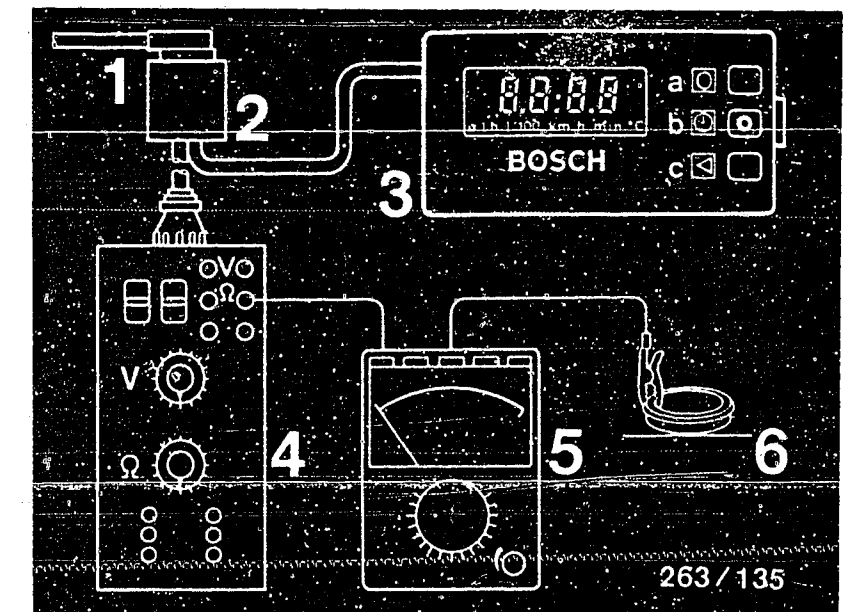
Resistance > 10 Ω

Testing with multimeter

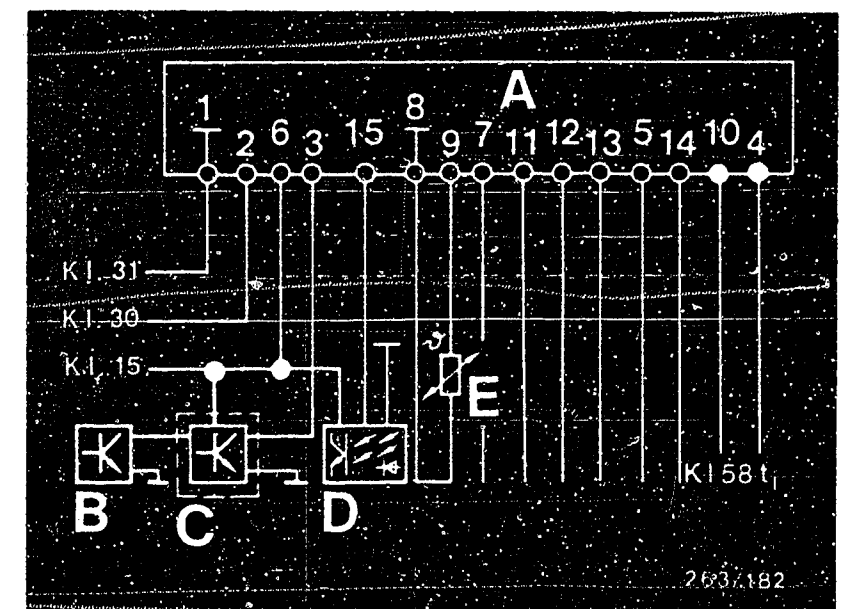
Pull vehicle wiring-harness plug on universal test adapter.
Test lead from pin 1 on TC wiring-harness plug to ground for continuity with ohmmeter.

Nominal resistance:
approx. 0 Ω

Eliminate open circuits/contact resistance.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Multimeter
- 6 = Cigarette lighter
- A = TC B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



(Only on Alfa 75 with LE-Jetronic, code:8.181; Motronic, code:8.89, 7.89, 9.91, 8.85, 7.85, 9.85)

Test step 2:

Component/function

Tank-sensor internal resistance,
pin 5 on TC

Operation:

Position

Program switch "V"
Program switch "Ω"
Test key

Program switch "V"	↓
Program switch "Ω"	6
Test key	-

Measuring equipment:

Multimeter

Measuring range:

Ω x 1

Connection: Blue test jacks on universal
test adapter

Instructions:

Note range on TC before removing tank sensor,
as range must be reset after removal.

Operation in vehicle:

Pull plug from adapter lead on TC.

Test specification (reading):

approx. 0 ... 345 Ω

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

Resistance > 345 Ω

Testing with multimeter

Test lead from pin 5 of TC vehicle
wiring-harness plug to tank-sensor
plug with ohmmeter.

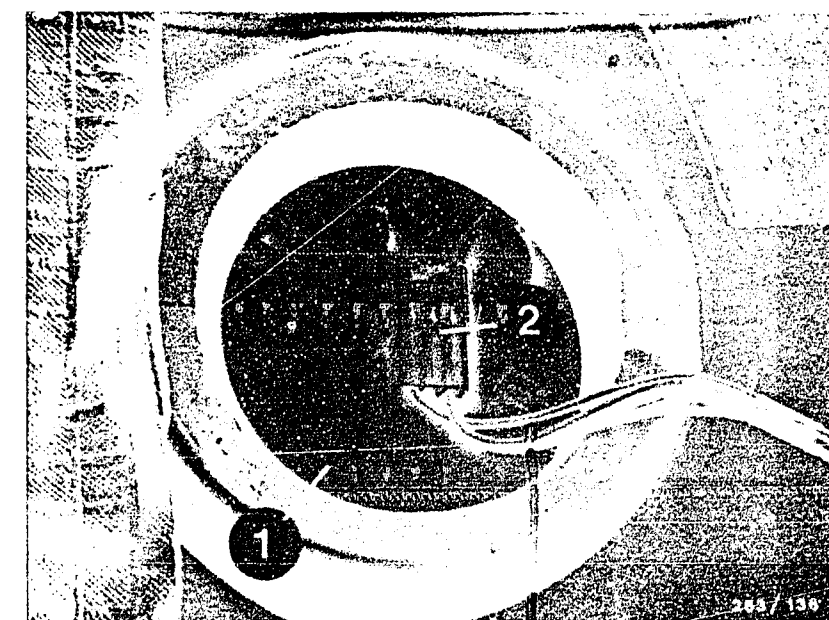
Nominal resistance:
approx. 0 Ω

Eliminate open circuit/contact
resistance.

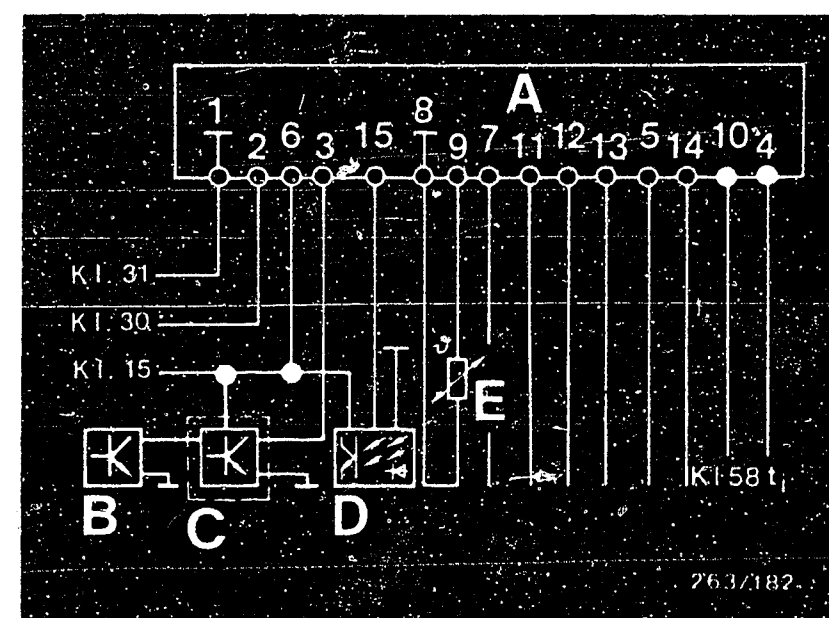
Tank sensor defective.

Replace defective tank sensor.

After testing, re-connect vehicle
wiring-harness plug.



- 1 = Tank sensor
- 2 = Plug
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



C8

Testing with universal test adapter
Alfa Romeo



C9

Testing with universal test adapter
Alfa Romeo



Calibration of range of tank with keys "b" and "c" (see top picture)

Assuming that each supplied trip computer is preset at a nominal voltage of the tank sender corresponding to a fuel quantity of 7 l, it is possible to make a further, more accurate calibration which compensates for the tolerances of the tank and of the tank sender.

This calibration is performed as follows:

- Contents of tank must be precisely 7 liters
- Ignition on (not important whether engine running)
- Simultaneously press key "b" and key "c" > 1 sec:
trip computer is in "calibration mode" when 0 km appears on the display.
- By turning the calibration potentiometer (through hole in key "b", see bottom picture), set display to 65...70, corresponding to 7 liters in tank (see picture 6).

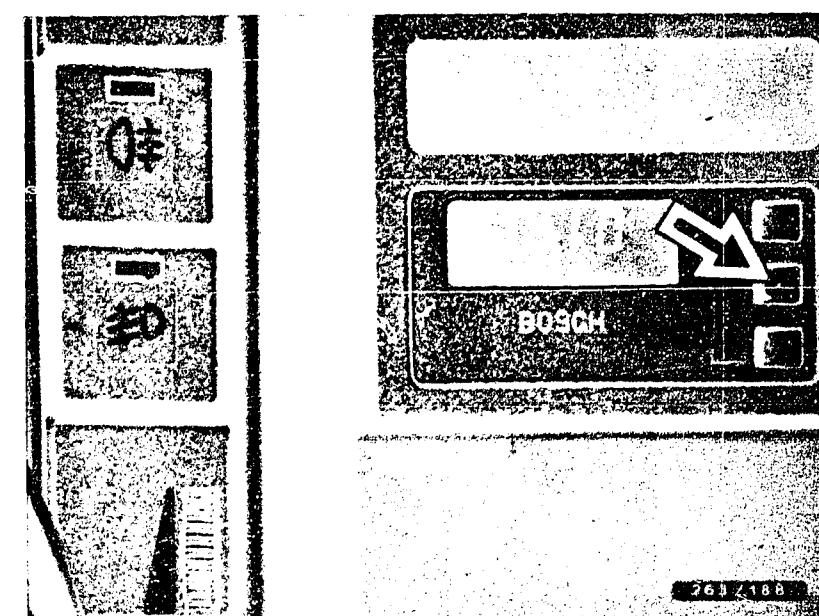
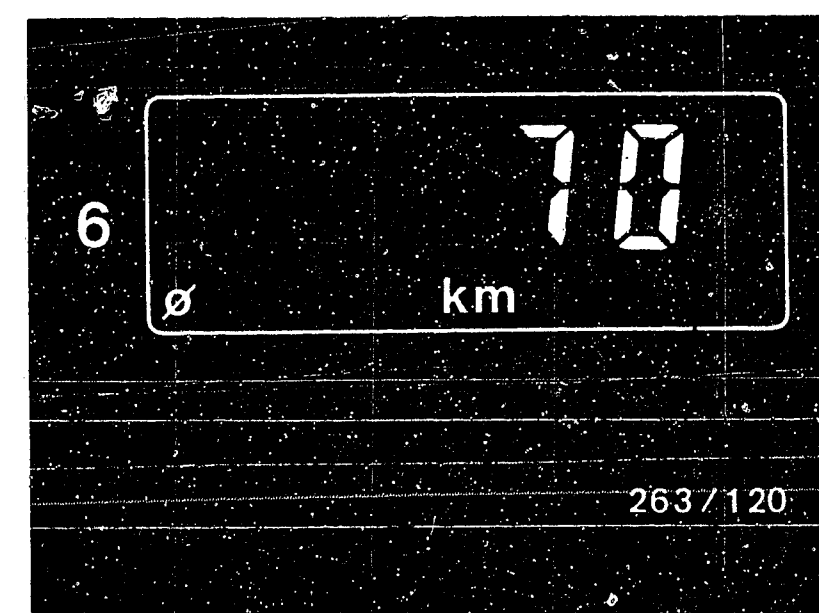
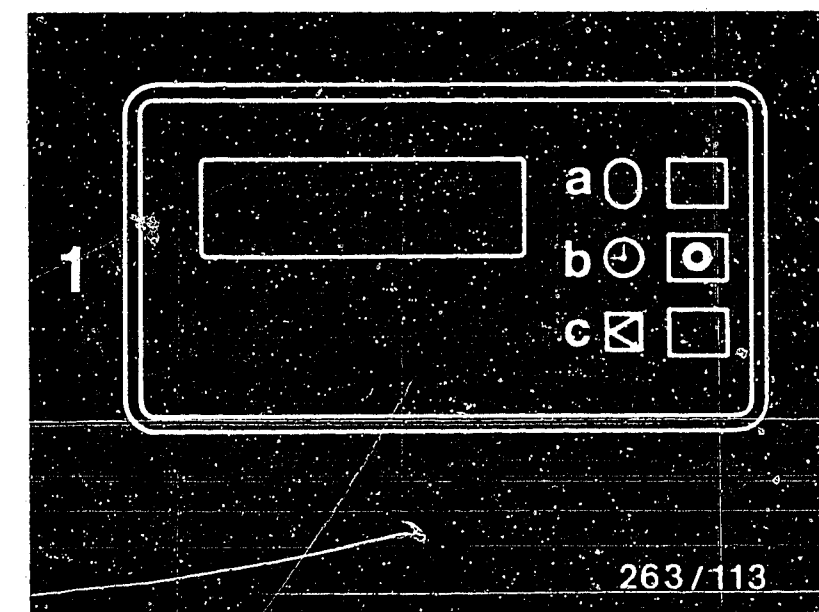
Note :

Potentiometer has a turning angle of max. 270°.

Turn carefully.

If previous range is known, the tank need not be emptied down to 7 l; the previous range can be set straight away at calibration potentiometer (in key "b"). Proceed in the same sequence as if 7 l in tank.

Calibration is completed when, after setting the above value, a different function is selected.



C10

Testing with universal test adapter
Alfa Romeo



C11

Testing with universal test adapter
Alfa Romeo



(Only on Alfa 75 with LE-Jetronic, code:8.181, 7.1984; L-Jetronic, code:9.72;
carburetor, code: 8.52, 7.56, 9.10; Motronic, code: 8.88, 8.84, 7.88, 7.84, 9.90, 9.84)

Test step 3:

Component/function

Encoding cable 2 on TC, pin 7

Operation:

Position

Program switch "V"
Program switch "Ω"
Test key

↓
7
-

no

Measuring equipment:

Multimeter

Measuring range:

Ω x 1

Connection: See upper illustration
Blue test jacks

Instructions:

CEM = Motronic of Italian origin

Operation in vehicle:

Trip-computer plug pulled.

Test specification (reading):

> 10 kΩ

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

Reading ∞Ω

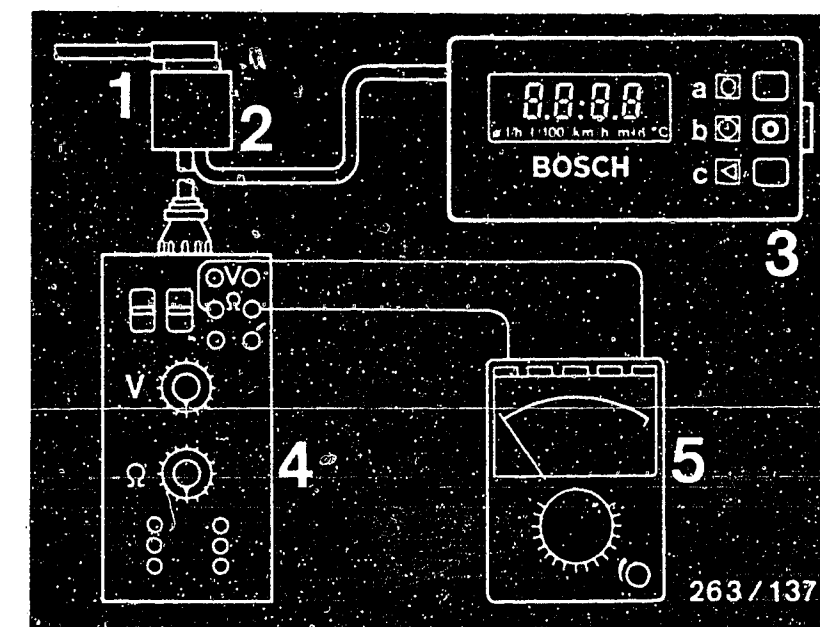
Testing with multimeter

Test lead from pin 7 of TC vehicle wiring-harness plug to central ground with ohmmeter.

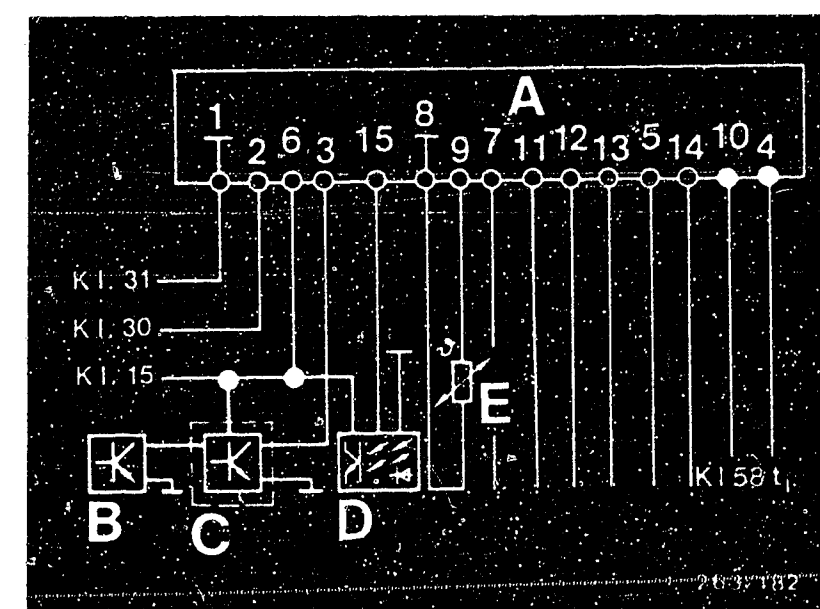
Nominal resistance: approx. 0 Ω

Eliminate open circuit/contact resistance.

Reconnect plug on TC.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Multimeter
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



C12

Testing with universal test adapter
Alfa Romeo



C13

Testing with universal test adapter
Alfa Romeo



Test step 4:

Component/function

Ground lead from outside temperature sensor (C) to TC (A) pin 8

Operation:

Program switch "V"
Program switch "Ω"
Test key

Position

↓
8
--

no

Measuring equipment:

Multimeter

Measuring range:

Ω x 1

Connection: See upper illustration
Blue test jack

Operation in vehicle:

Test specifications (reading):

0 ... 10 Ω

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

Resistance ∞Ω

Testing with multimeter

Test lead from pin 8 of TC vehicle wiring-harness plug to outside temperature sensor with ohmmeter.

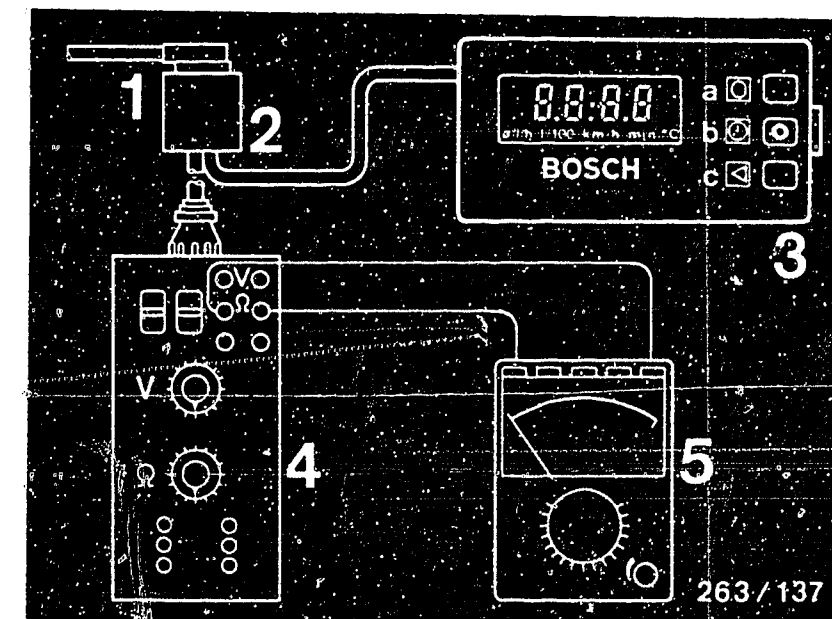
Resistance approx. 0 Ω

Eliminate open circuit/contact resistance.

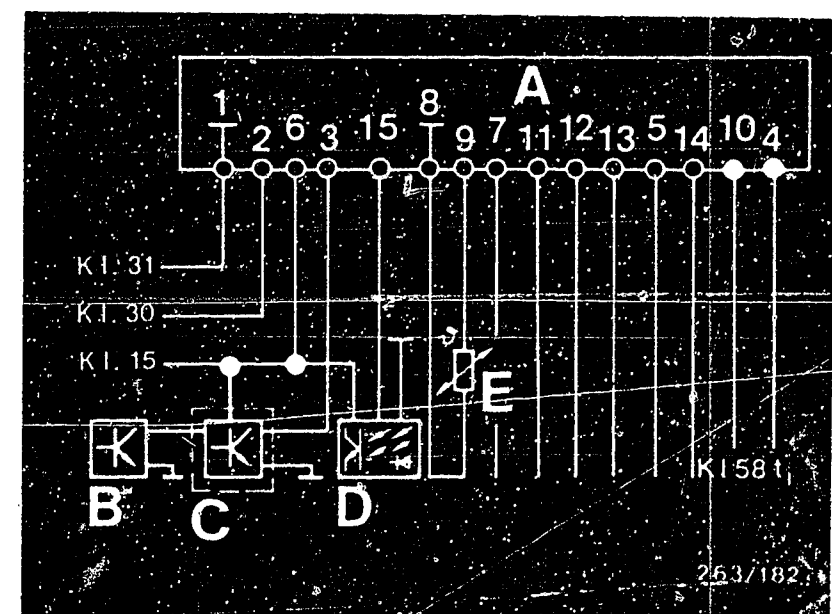
Outside temperature sensor defective.

Replace outside temperature sensor.

Reconnect plug on TC.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Multimeter
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



C14

Testing with universal test adapter
Alfa Romeo



C15

Testing with universal test adapter
Alfa Romeo



(Does not apply to Alfa 75 with carburetor.
Motronic, code:8.84, 8.85, 7.84, 7.85, 9.84, 9.85)

Test step 5:

Component/function

Encoding cable 3 to TC, pin 11

Operation:

Position

Program switch "V"
Program switch "Ω"
Test key

11	
-	

Measuring equipment

Multimeter

Measuring range:

Ω x 1

Connection: See upper illustration, blue test jacks

Operation in vehicle:

TC plug pulled

Test specification (reading):

> 10 kΩ

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

Resistance ∞Ω

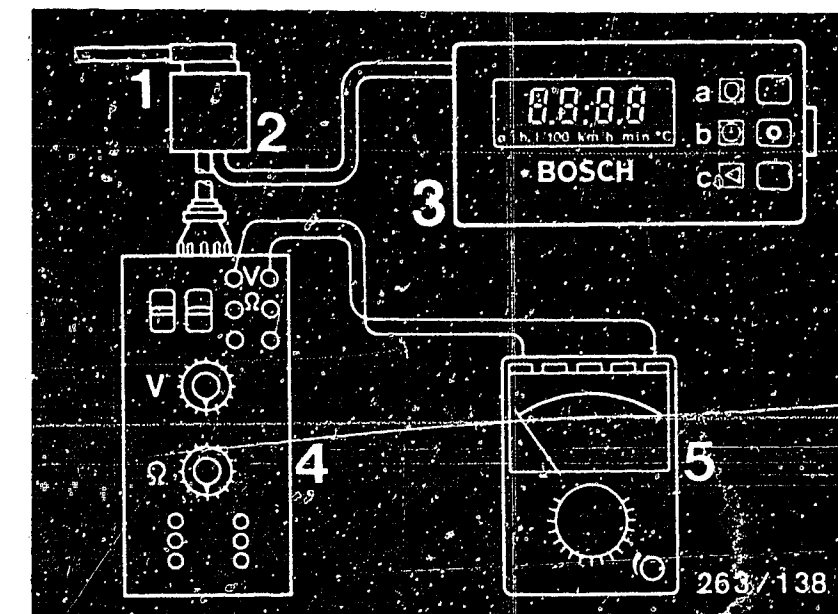
Testing with multimeter

Test lead from pin 11 of TC vehicle wiring-harness plug to central ground with ohmmeter.

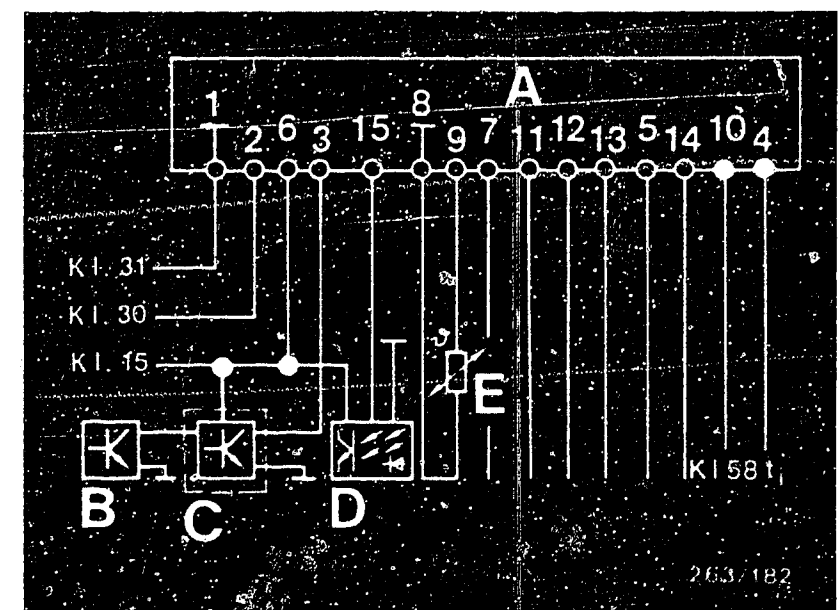
Nominal resistance:
approx. 0 Ω

Eliminate open circuit/contact resistance.

Reinsert plug on TC.



- 1 = 15-pin plug on wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Multimeter
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



C16

Testing with universal test adapter
Alfa Romeo



C17

Testing with universal test adapter
Alfa Romeo



(Does not apply to Alfa 75 with Motronic, code: 8.88, 8.84, 8.89, 7.88, 7.89, 7.84, 9.91, 9.90, 9.84)

Test step 6:

Components/function:

Encoding cable 4 at TC, pin 12

Operation:

Position

Program switch "V"

↓

Program switch "Ω"

12

Test key

-

Measuring equipment:

Multimeter

Measuring range:

Ω x 1

Connection: See upper illustration, blue test jacks

Operation in vehicle:

TC plug pulled

Test specification (reading):

> 10 kΩ

Is value within tolerance?

no

Trouble-shooting:

Defect:

Resistance ∞Ω.

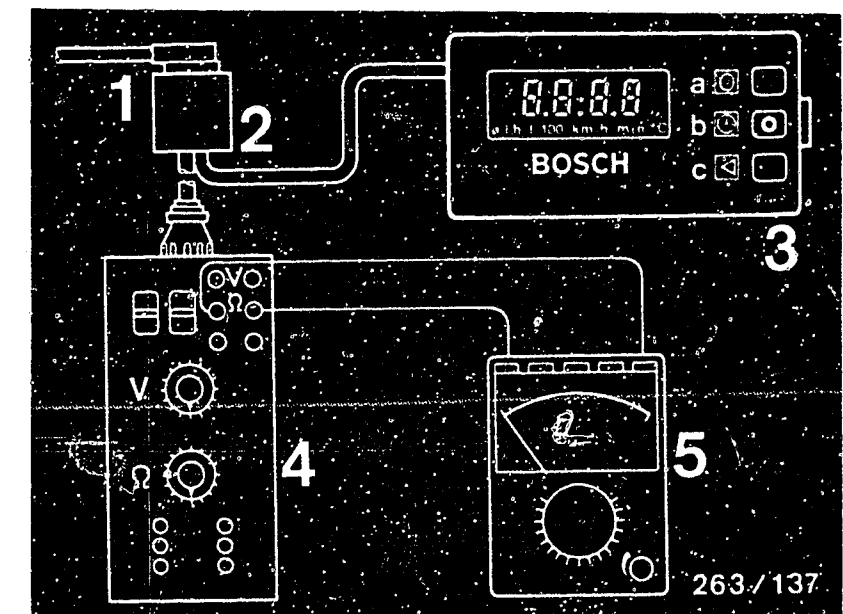
Testing with multimeter

Test lead from pin 12 of TC vehicle wiring-harness plug to central ground with ohmmeter.

Nominal resistance:
approx. 0 Ω

Eliminate open circuit/contact resistance.

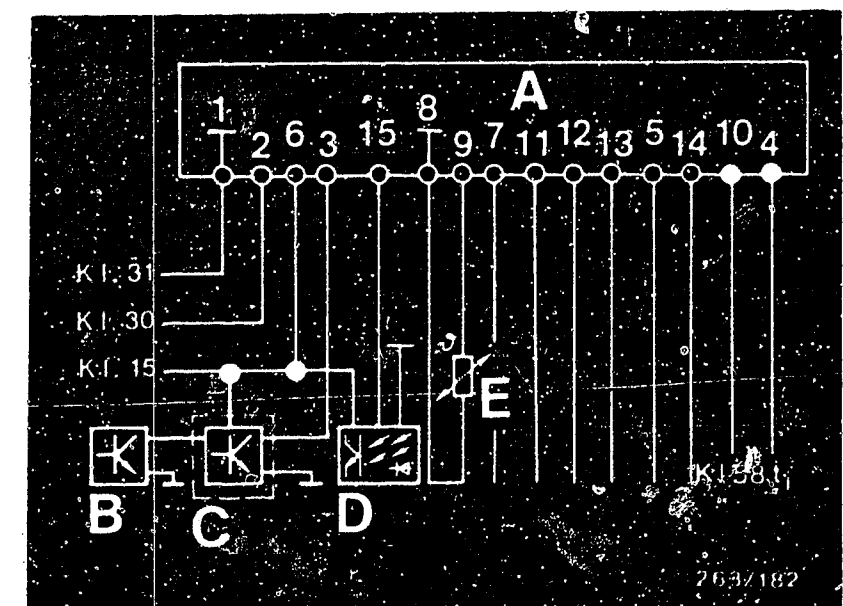
Reinsert plug on TC.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Multimeter
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor

yes

Continued on next micro-page



C18

Testing with universal test adapter

Alfa Romeo



C19

Testing with universal test adapter

Alfa Romeo



(Does not apply to Alfa 75 with Motronic, code: 7.85, 8.85, 9.85, 9.88)

Test step 7:

Component/function

Encoding cable 5 to TC, pin 13

Operation:

Position

Program switch "V"
Program switch "Ω"
Test key

13	
-	

no

Measuring equipment:

Multimeter

Measuring range:

Ω x 1

Connection: See upper illustration, blue test jacks

Operation in vehicle: TC plug pulled

Test specifications (reading):

> 10 kΩ

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

Resistance ∞Ω

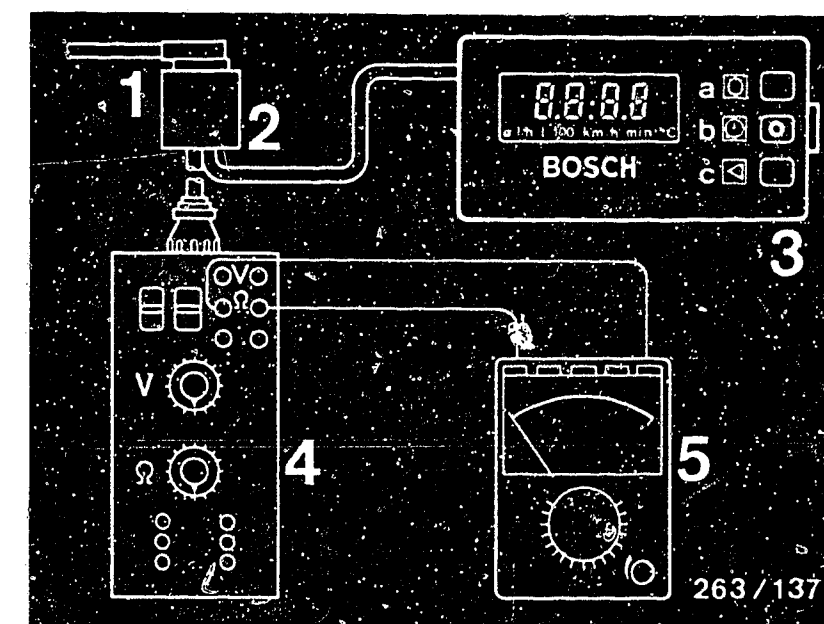
Testing with multimeter

Test lead from pin 13 of TC vehicle wiring-harness plug to central ground with ohmmeter.

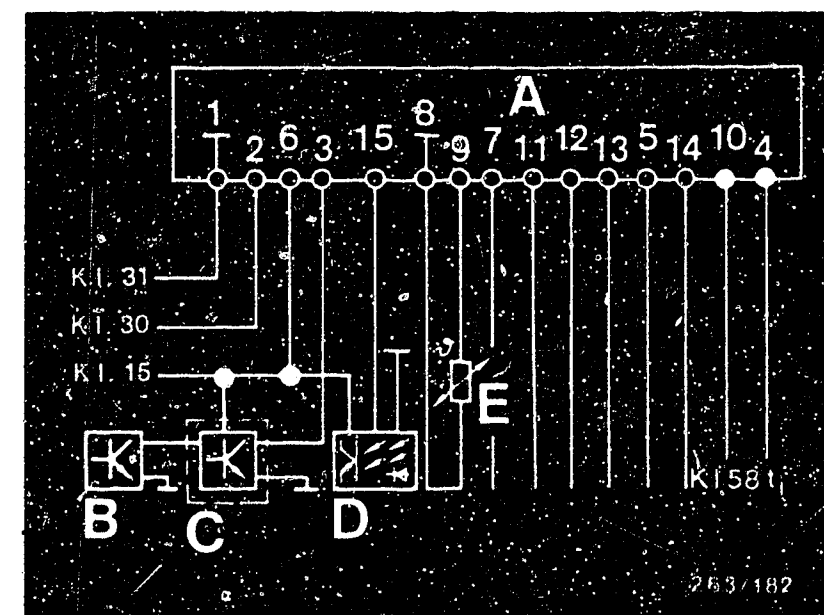
Resistance approx. 0 Ω

Eliminate open circuit/contact resistance.

Reinsert plug at TC.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Multimeter
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



C20

Testing with universal test adapter
Alfa Romeo



C21

Testing with universal test adapter
Alfa Romeo



(Only on Alfa 75 with LE-Jetronic, code:8.181;
Motronic, code: 8.85, 8.89, 7.85, 7.89, 9.91, 9.85)

Test step 8:

Component/function

Internal resistance of tank sensor,
pin 14 on TC

Operation:

Program switch "V"
Program switch " Ω "
Test key

Position

	V
	14
	-

Measuring equipment:

Multimeter

Measuring range:

$\Omega \times 1$

Connection: Blue test jacks on universal test
adapter.

Instructions: Before removing tank sensor,
note range on TC, since range must be reset.

Operation in vehicle:

Adapter-lead plug on TC pulled

Test specification (reading):

0 ... 345 Ω

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

Resistance > 345 Ω

Testing with multimeter

Test lead from TC vehicle
wiring-harness plug with ohmmeter.

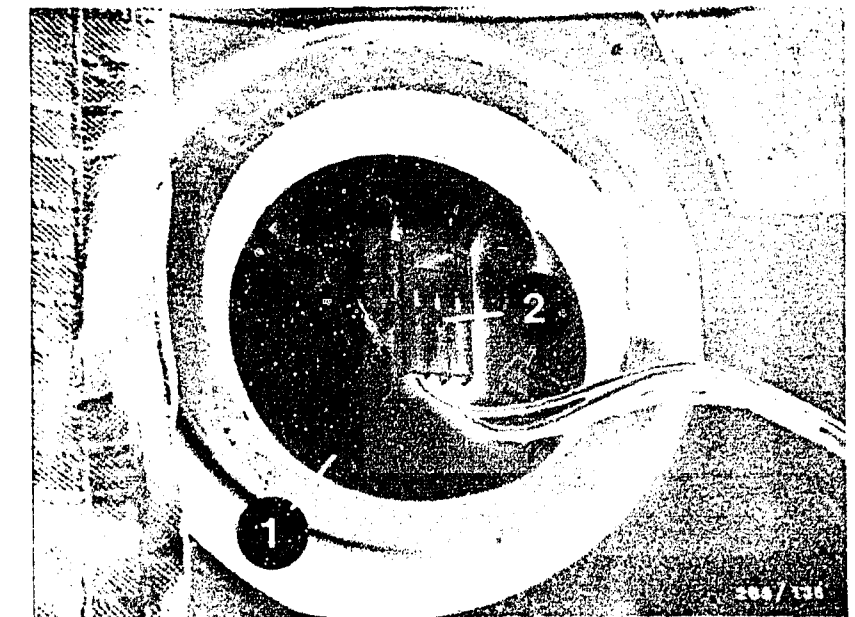
Nominal resistance:
approx. 0 Ω

Eliminate open circuit/contact
resistance.

Tank sensor defective.

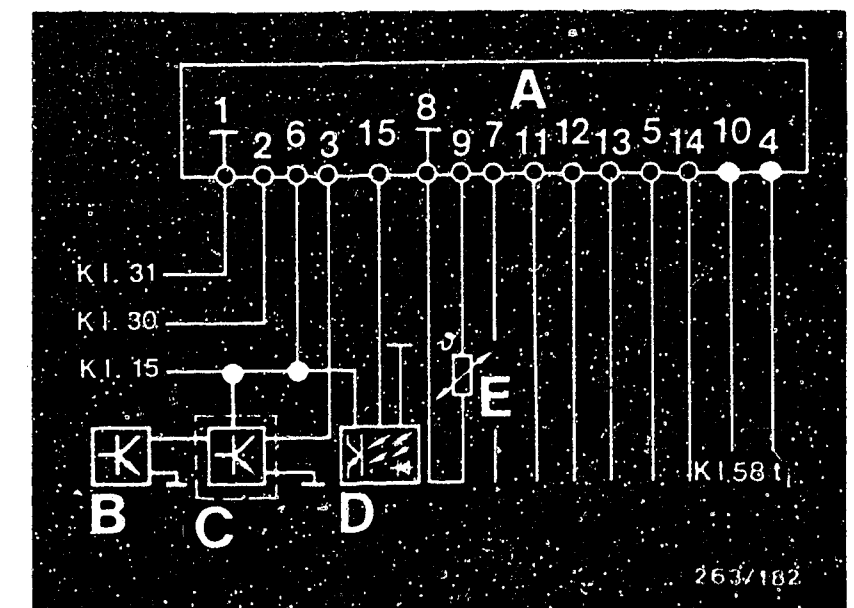
Replace defective tank sensor.

After testing, reinsert vehicle
wiring-harness plug



1 = Tank sensor
2 = Plug

A = TC
B = Distance sensor
C = Distance-pulse adaptation
control unit
D = Fuel-consumption sensor
E = Outside temperature sensor



C22

Testing with universal test adapter
Alfa Romeo



C23

Testing with universal test adapter
Alfa Romeo



Calibrating range with buttons "b" and "c" (see upper illustration)

Adapter lead plugged to TC.

With the precondition that every TC delivered is preset to a nominal tank-sensor voltage corresponding to a fuel quantity of 7 l, it is possible to calibrate the unit even more precisely to compensate for tolerances within the tank and the tank sensor. This calibration is undertaken as follows:

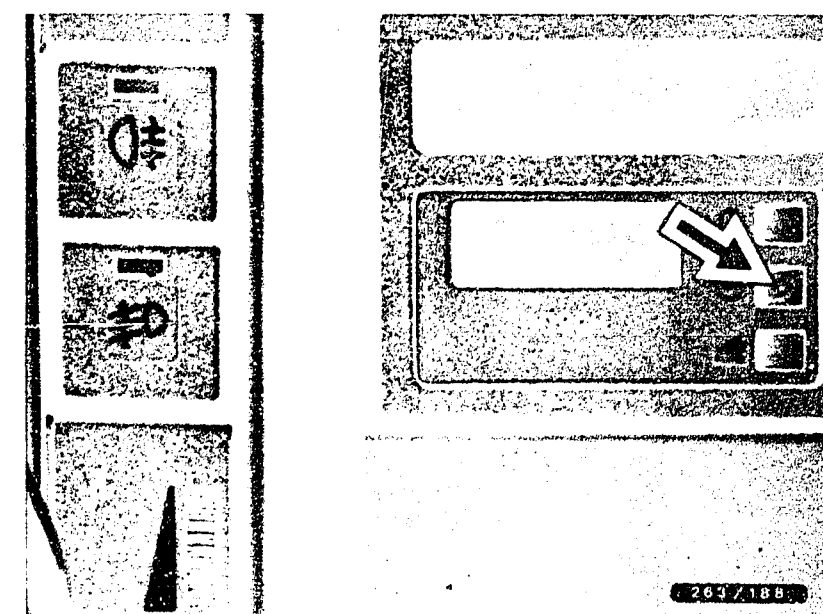
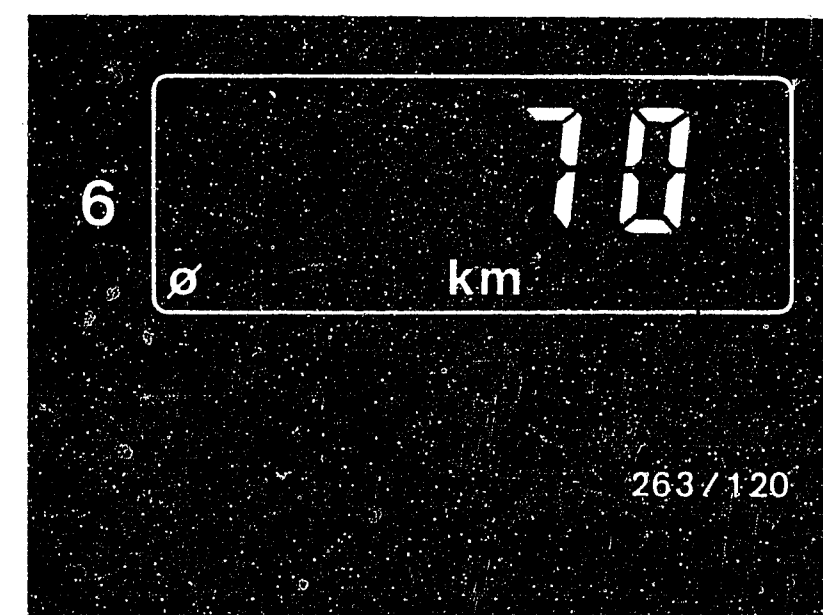
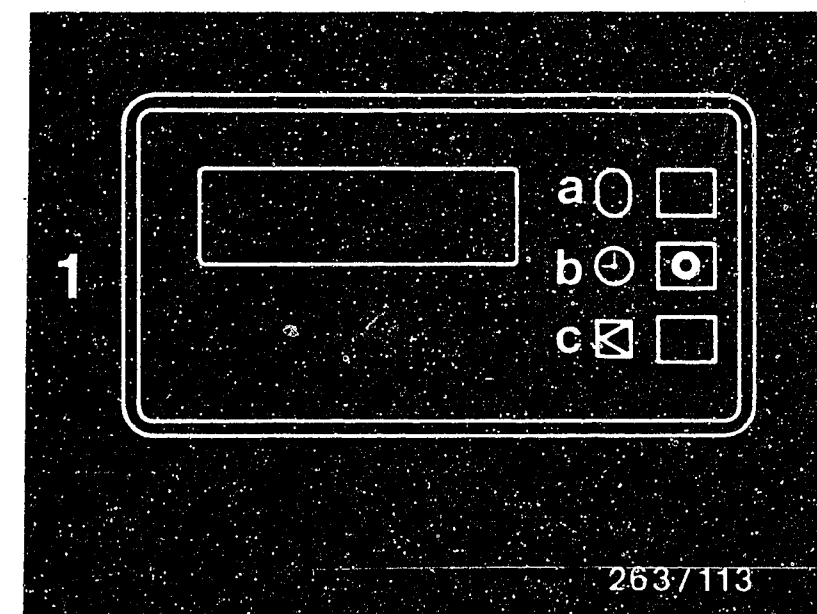
- Tank contact must be exactly 7 l.
- Ignition on (regardless of whether engine is running)
- Press buttons "b" and "c" simultaneously > 1 second: TC is in the "calibration mode", when the display shows 0 km.
- Set the display to 65 ... 70, corresponding to a tank content of 7 l (see figure "6"), by turning the calibration potentiometer (through hole in button "b", see lower illustration).

Note :

Potentiometer has a maximum twist angle of 270°

Turn carefully!

If the previous range is known, the tank must not be emptied to 7 l; instead, the previous range can be immediately set using the calibration pot (in button "b"). To do this, proceed in the same order as with the 7 l tank content. Calibration is ended when another function is selected after setting the value indicated above.



D1

Testing with universal test adapter

Alfa Romeo



D2

Testing with universal test adapter

Alfa Romeo



(Only for vehicles with carburetor)

Test step 9

Components/function

Connection for fuel-consumption sensor on TC,
pin 15

Operation:

Position

Program switch "V"
Program switch "Ω"
Test key

	↓
20	
-	

Measuring equipment:

Multimeter

Measuring range:

Ω x 1

Connection: See upper illustration.
Blue test jacks

Instructions:

Measure resistance from pin 15 to pin 6
(term. 15)

Operation in vehicle:

Adapter lead plugged to TC, ignition on.

Test specification (reading):

approx. 20 kΩ

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

Resistance < approx. 20 kΩ
> approx. 20 kΩ

Testing with multimeter

Test lead from pin 15 of vehicle
wiring-harness plug to fuel-
consumption sensor with ohmmeter.

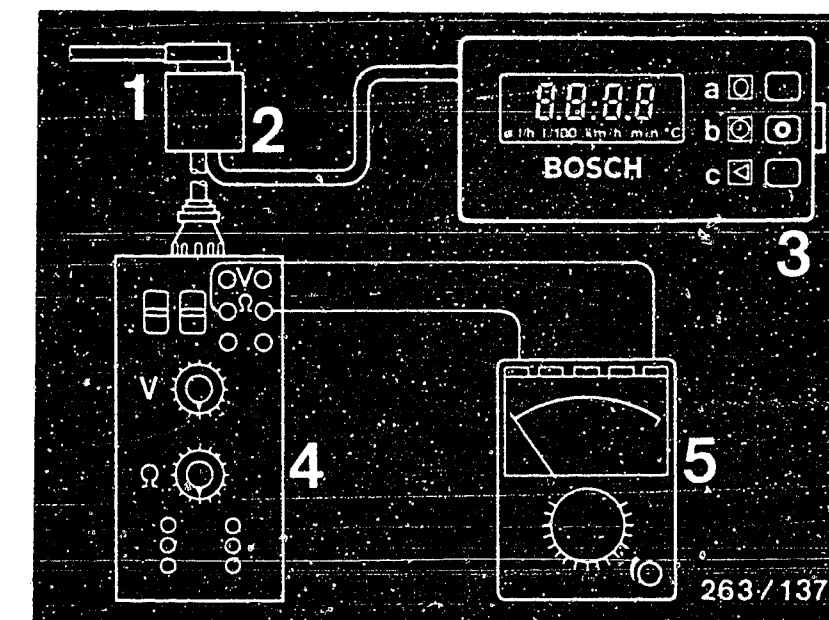
Nominal resistance:
approx. 0 Ω

Eliminate open circuit/contact
resistance.

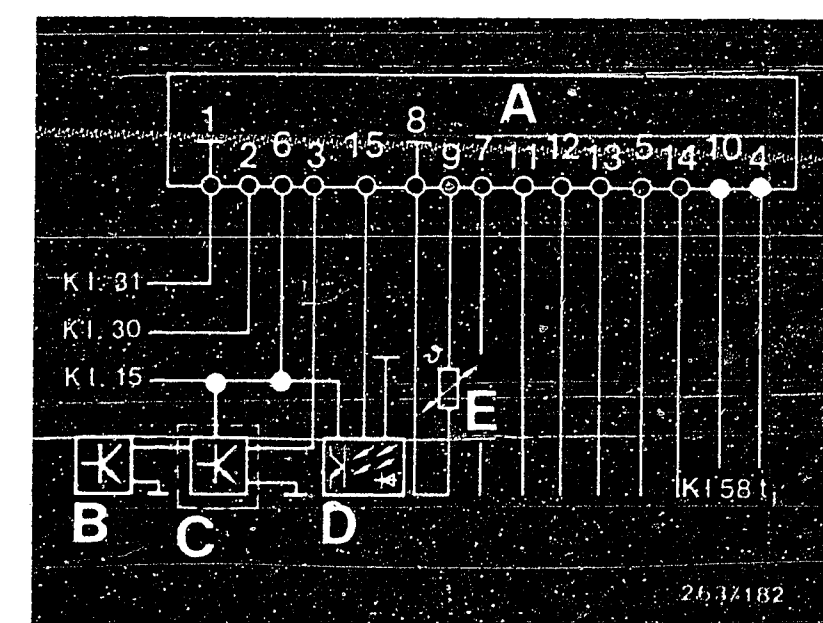
Fuel-consumption sensor is defective.

Replace defective fuel-consumption
sensor.

After testing, reinsert vehicle
wiring-harness plug.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Multimeter
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



D3

Testing with universal test adapter
Alfa Romeo



D4

Testing with universal test adapter
Alfa Romeo



Test step 10

Component/function

Voltage supply for TC, pin 2

Operation:

Position

Operation:

Position

Program switch "V"

1

Program switch "Ω"

-

Test key

-

Measuring equipment:

Multimeter

Measuring range:

0 ... 15 V

Connection: See upper illustration.

Test jacks: red = positive

black = negative

Operation in vehicle:

Test specification (reading):

$U_{batt} \geq 12 \text{ V}$

Is value within tolerance?

yes

yes

Continued on next micro-page

Trouble-shooting:

Defect:

No voltage present

Voltage $\leq 11.5 \text{ V}$

Testing with multimeter

Test lead from vehicle wiring-harness plug pin 2 to term. 30 (fuse box) with ohmmeter.

Nominal resistance:
approx. 0Ω

Eliminate open circuit/contact resistance:

Fuse no. 15 defective (lower illustration).

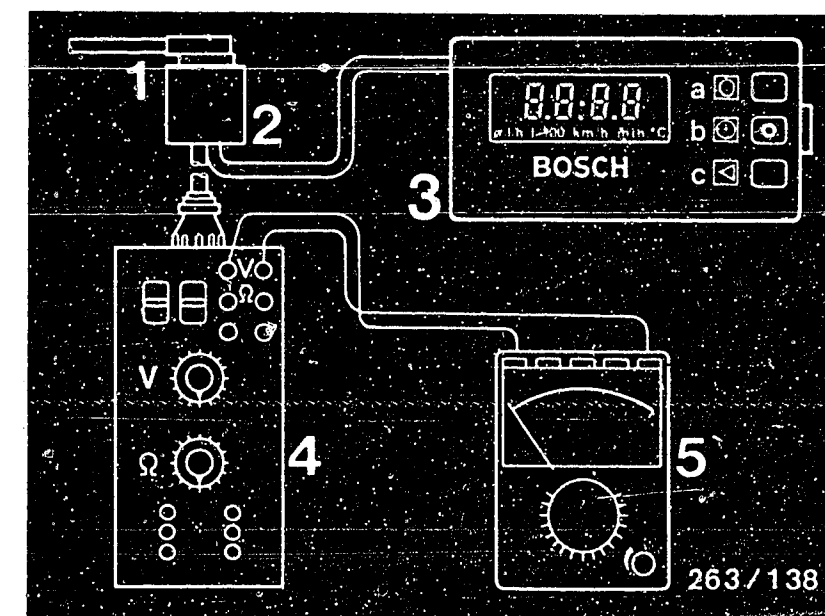
Replace defective fuse.

Insufficient battery charge.

Recharge battery or replace defective battery.

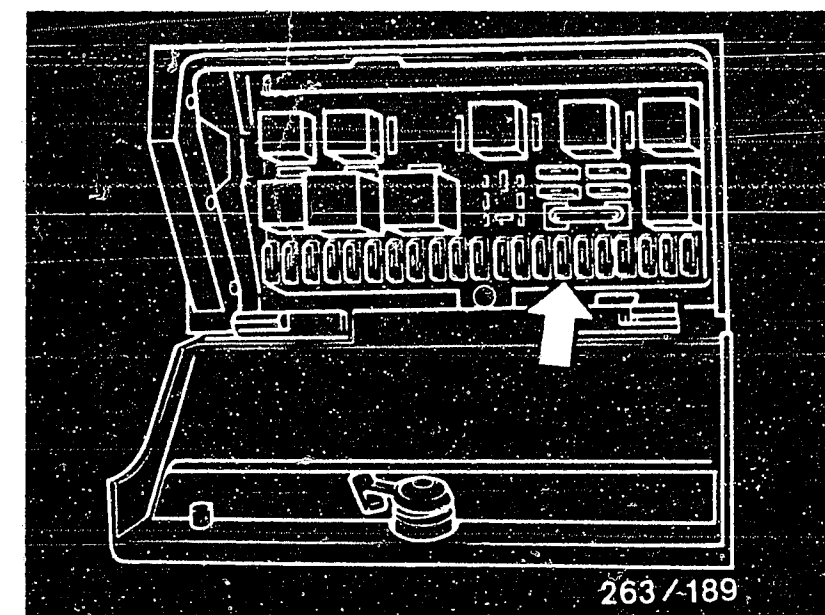
After rectifying defect, reset clock time.

After testing has been completed, reinsert vehicle wiring-harness plug on TC.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Multimeter

Fuse no. 15



D5

Testing with universal test adapter
Alfa Romeo



D6

Testing with universal test adapter
Alfa Romeo

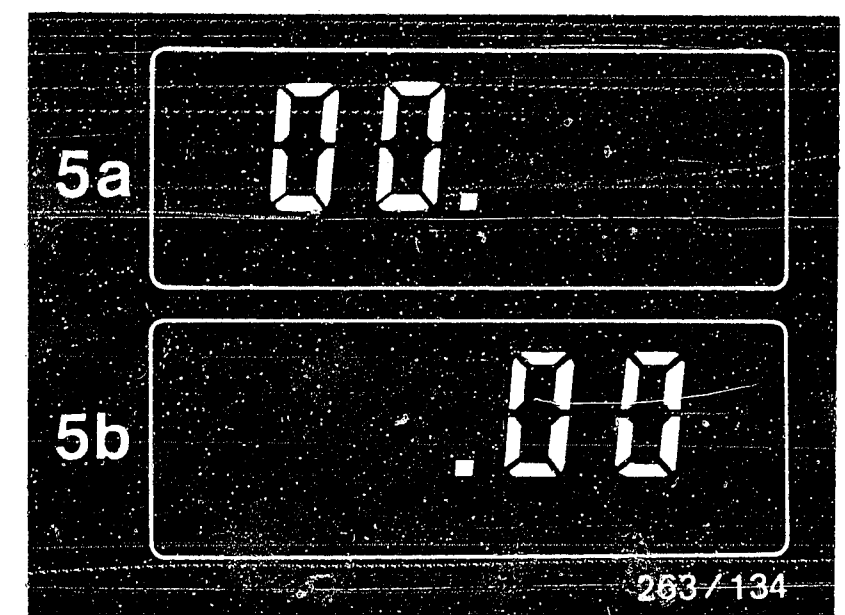
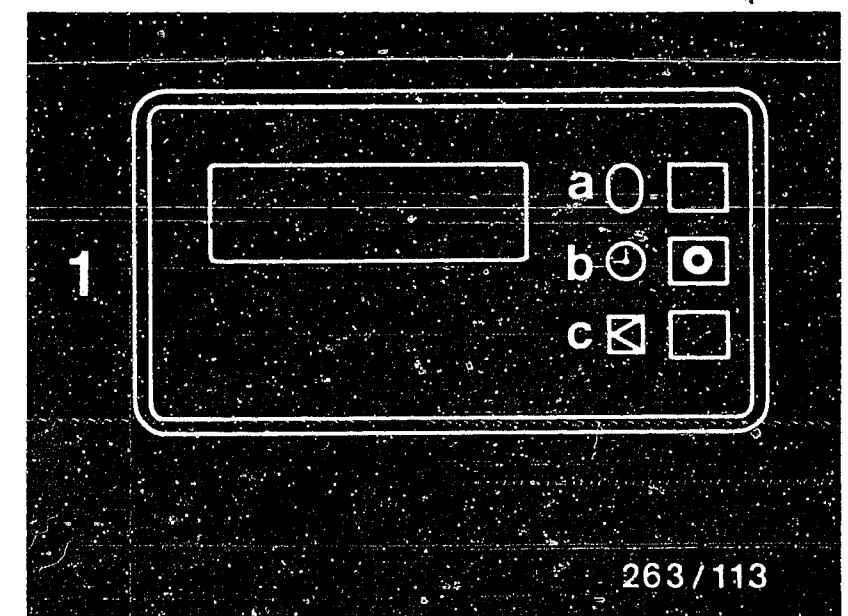


Setting the time with keys "a" and "b" (see top picture)

Trip computer in "time of day" mode, ignition on.
First pressing of key "a" causes switching-off of the minutes display (see picture a). Subsequent brief pressing of key "b" advances the hours display by one unit; pressing for longer causes automatic fast advance. When key "a" is actuated a second time, this switches off the hours display (see picture 5b); setting of minutes with key "b" in same manner as for hours display.

The clock is started by pressing button "c" or "a" and likewise by switching off the ignition.

The dots between hours and minutes do not flash. .



D7

Testing with universal test adapter
Alfa Romeo



D8

Testing with universal test adapter
Alfa Romeo



Test step 11:

Component/function

Distance-sensor connection on TC, pin 3.

Operation:

	Position
Program switch "V"	2
Program switch "Ω"	-
Test key	-

Measuring equipment:

Motortester e.g. MOT 201

Measuring range:

Connection: See upper illustration, test jacks on test adapter

Operation in vehicle:

Engine running and drive wheels turning

Test specification (reading):

See upper illustration

$U_1 \leq 0.2 \text{ V} / U_2 \geq 7 \text{ V}$

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

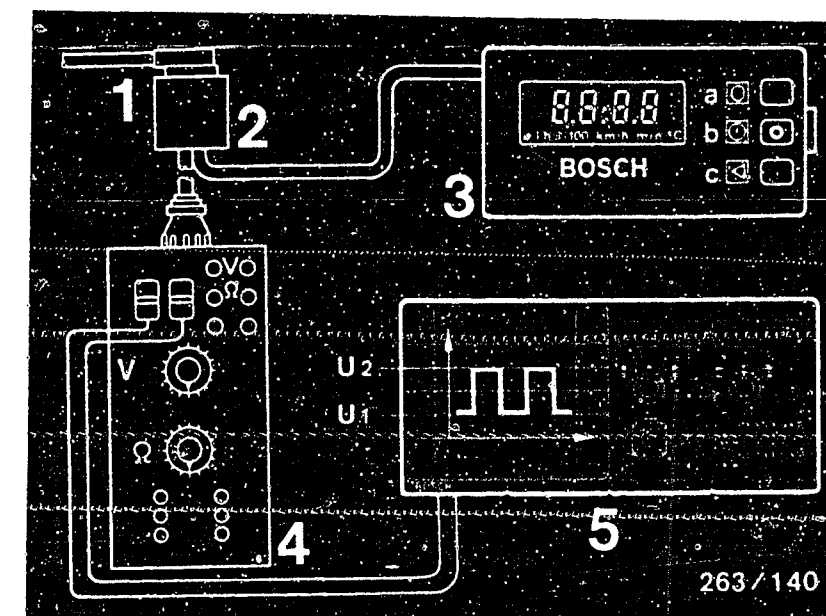
Defect:

No timed voltage can be detected on oscilloscope.

Testing with multimeter

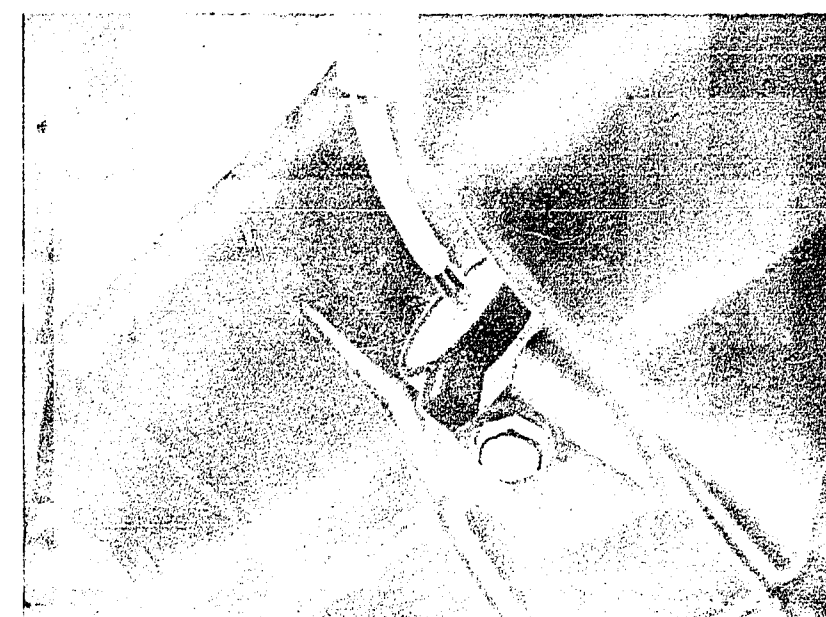
no

Continued on next micro-page



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Motortester with oscillogram

Distance sensor on transmission



D9

Testing with universal test adapter
Alfa Romeo



D10

Testing with universal test adapter
Alfa Romeo



Testing with multimeter

- * Test lead from pin 3 on TC plug to pulse converter term. 87 (see plug base in fuse box, upper illustration) with ohmmeter.

Nominal resistance: approx 0 Ω

Eliminate open circuit/contact resistance.

- * With motortester (e.g. MOT 201).
Measure signal from distance sensor on plug base term. 30 and term. 31 of pulse converter.

If signal is O.K., measure supply voltage of pulse converter at term. 31 and term. 86

Nominal supply voltage: > 12 V.

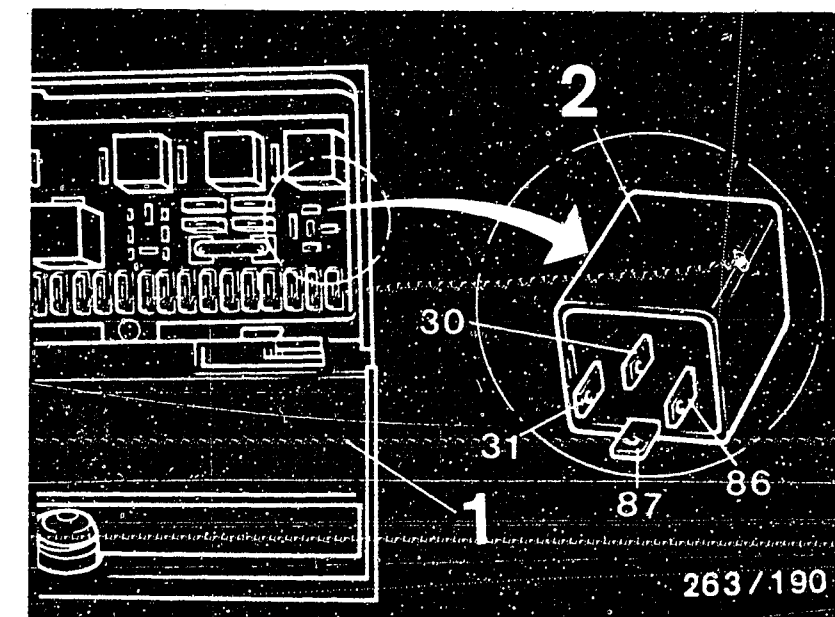
- * No signal at plug base:

Test lead from plug base term. 30 to distance sensor with ohmmeter.
Nominal resistance: approx. 0 Ω
Eliminate open circuit/contact resistance.

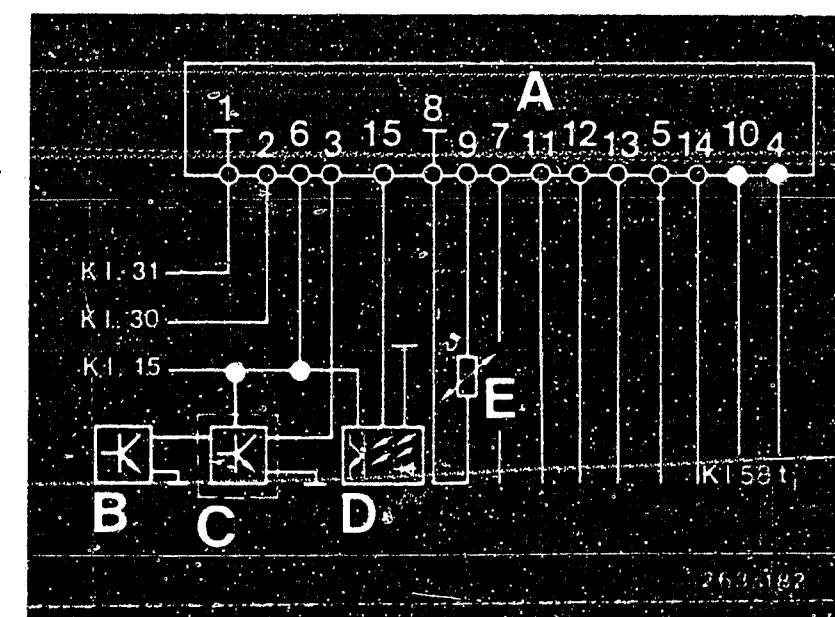
- * Distance sensor defective (if km display on TC functioning)
Relace defective distance sensor in transmission housing.

- * Pulse converter defective.

Replace defective pulse converter (upper illustration).



- 1 = Fuse box
- 2 = Pulse converter
- 30 = Signal input
- 31 = Ground
- 86 = Term. 15
- 87 = Signal output
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



D11

Testing with universal test adapter
Alfa Romeo



D12

Testing with universal test adapter
Alfa Romeo



Test step 12:

Component/function

Injection signal (t_i) on TC plug pin 4.

Operation:

Position

Program switch "V"
Program switch "Ω"
Test key

3
-
-

Measuring equipment:

Motortester, e.g. MOT 201

Measuring range:

Connection: See upper illustration, test jacks on uni-adapter

Operation in vehicle:

Engine running in idle

Test specification (reading):

See upper illustration (oscillogram)

Does t_i signal appear?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

No oscillogram of t_i signal

Testing with multimeter

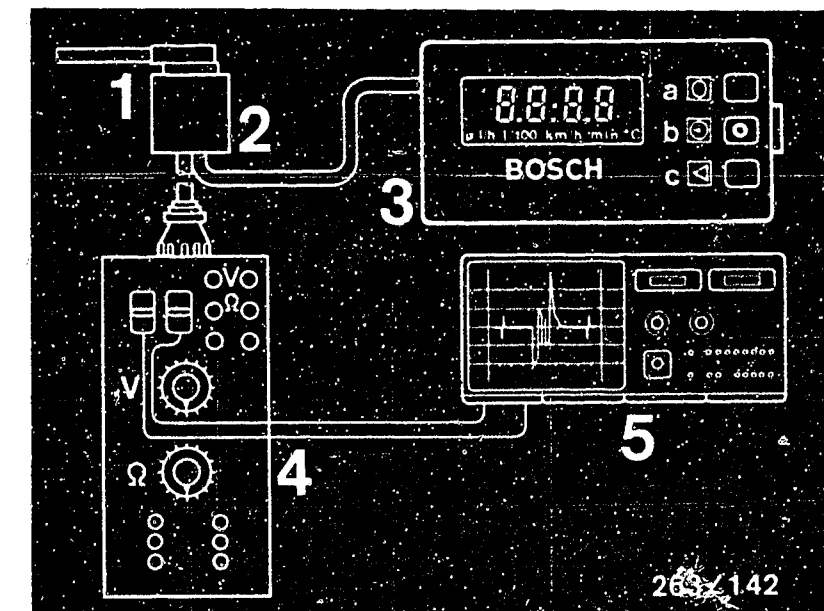
Disconnect plug on TC. Test lead from pin 4 of TC wiring-harness plug to L-Jetronic control unit with ohmmeter. Disconnect plug on control unit.

Nominal resistance:
approx. 0 Ω

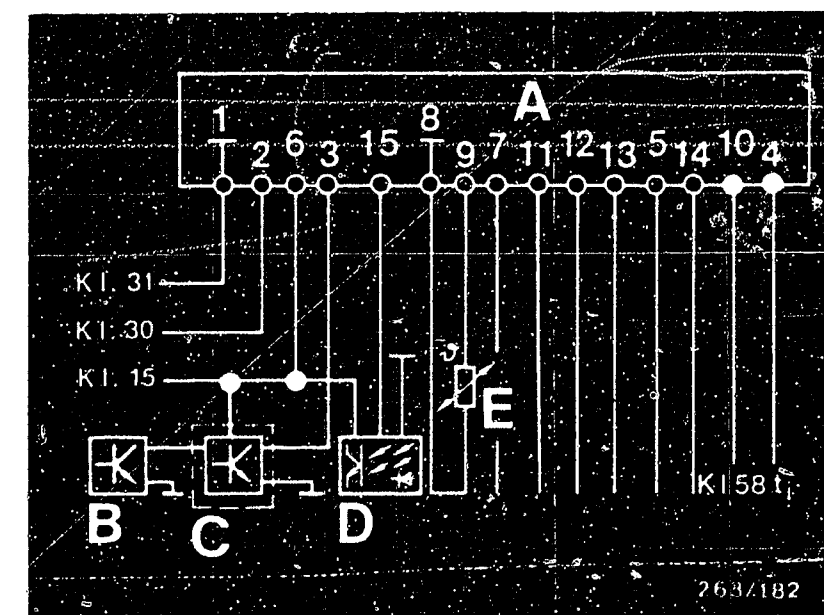
Eliminate open circuit/contact resistance.

If lead O.K., check control unit.

After testing, reinsert plug on TC.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Motortester with oscilloscope of t_i signal
- A = TC B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



D13

Testing with universal test adapter
Alfa Romeo



D14

Testing with universal test adapter
Alfa Romeo



(Does not apply to Alfa 75 if pin 5 not assigned)

Test step 13:
Component/Function

Tank sensor with lead to TC pin 5

Operation:

Position

Program switch "V"
Program switch "Ω"
Test key

4
-
-

Measuring equipment:

Multimeter

Measuring range:

0 ... 15 V

Connection: See upper illustration
Test jacks: red = positive, black = negative

Instructions: After replacing the tank sensor, range must be reset.

Operation in vehicle:
Ignition on/tank-sensor plug connected.

Test specifications (reading):

Tank full	approx. 0.5 V
Tank 3/4 full	approx. 1.0 V
Tank 1/2 full	approx. 1.5 V
Tank 1/4 full	approx. 2.3 V
Tank on reserve	approx. 2.5 V
Tank empty	approx. 2.7 V

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

No display or false display on multimeter

Testing with multimeter:

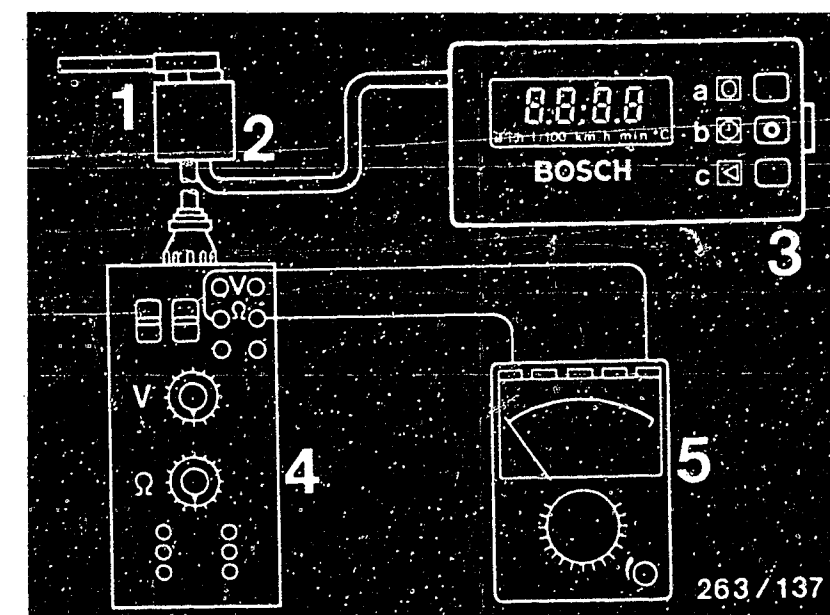
Switch off ignition, pull plug from TC.
Test lead from TC plug pin 5 to tank sensor with ohmmeter.

Nominal resistance:
approx. 0 Ω

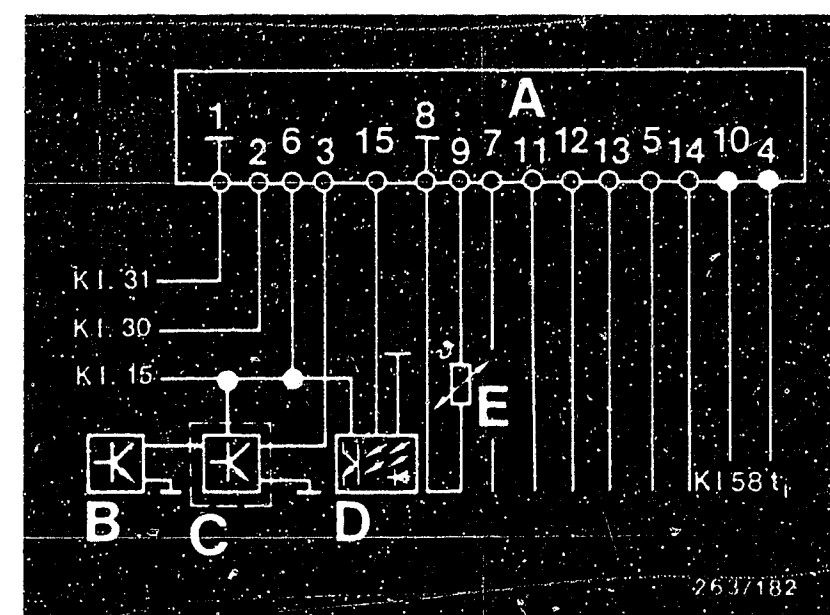
Eliminate open circuit/contact resistance.

Tank sensor defective. Replace defective tank sensor.

After testing, reinsert TC plug.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Multimeter
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



D15

Testing with universal test adapter
Alfa Romeo



D16

Testing with universal test adapter
Alfa Romeo



Calibration of range of tank with keys "b" and "c" (see top picture)

Assuming that each supplied trip computer is preset at a nominal voltage of the tank sender corresponding to a fuel quantity of 7 l, it is possible to make a further, more accurate calibration which compensates for the tolerances of the tank and of the tank sender.

This calibration is performed as follows:

- Contents of tank must be precisely 7 liters
- Ignition on (not important whether engine running)
- Simultaneously press key "b" and key "c" > 1 sec:
trip computer is in "calibration mode" when 0 km appears on the display.
- By turning the calibration potentiometer (through hole in key "b", see bottom picture), set display to 65...70, corresponding to 7 liters in tank (see picture 6).

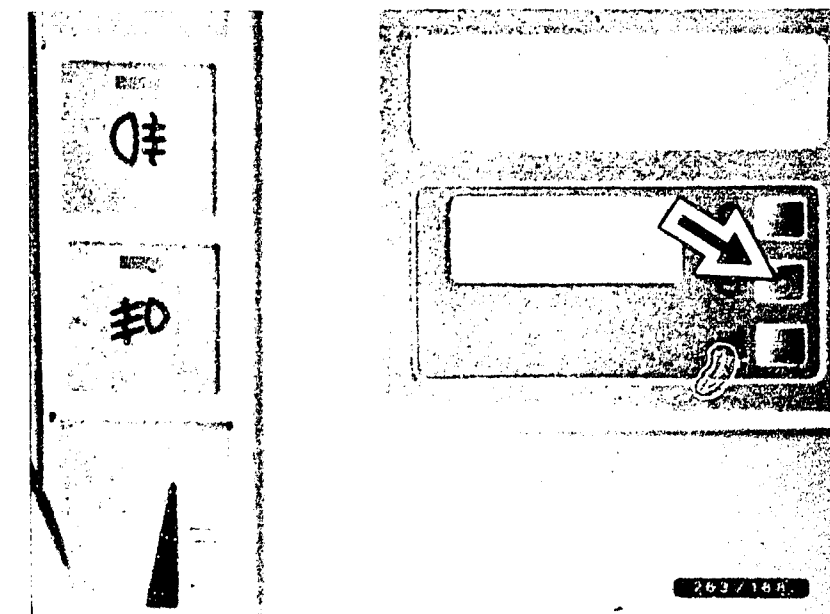
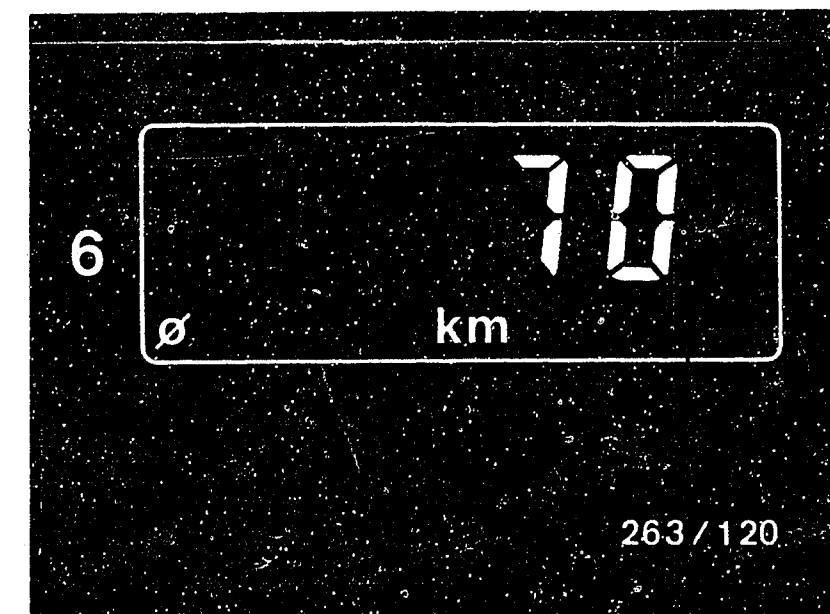
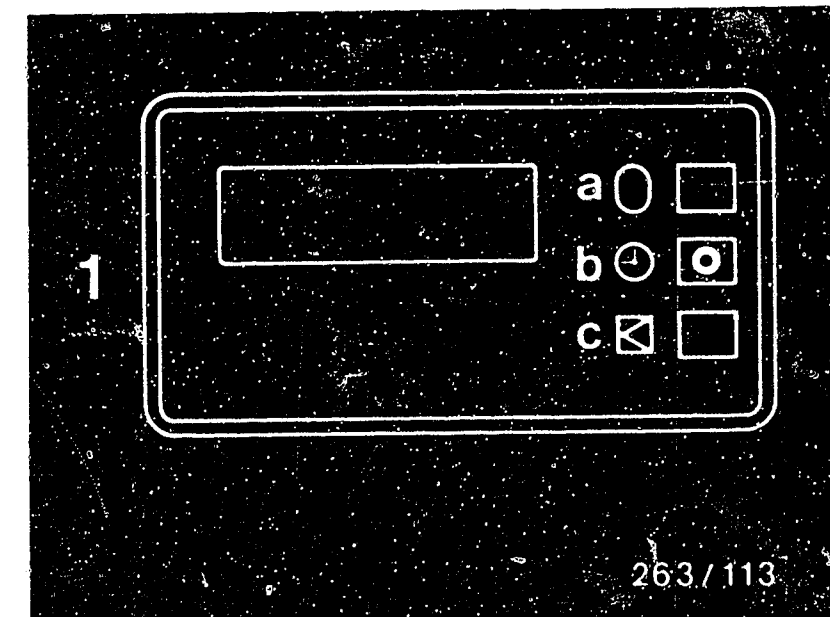
N o t e :

Potentiometer has a turning angle of max. 270°.

Turn carefully.

If previous range is known, the tank need not be emptied down to 7 l; the previous range can be set straight away at calibration potentiometer (in key "b"). Proceed in the same sequence as if 7 l in tank.

Calibration is completed when, after setting the above value, a different function is selected.



D 17

Testing with universal test adapter
Alfa Romeo



D 18

Testing with universal test adapter
Alfa Romeo



(Does not apply to Alfa 75 when pin 5 not assigned)

Test step 14:

Component/function

Voltage stabilization for tank sensor at TC pin 5

Operation:

Position

Program switch "V"	4
Program switch "Ω"	—
Test key	—

Measuring equipment:

Multimeter

Measuring range:

0 ... 15 V

Connection: See upper illustration

Measuring range: red = positive
black = negative

Operation in vehicle:

Ignition "on"

Tank-sensor plug disconnected.

Test specification (reading):

approx. 5 V

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

< or > 5 v

Testing with multimeter

Switch off ignitiopn.
Pull plug from TC.

Test lead from pin 5 of TC plug to instrument cluster with ohmmeter.

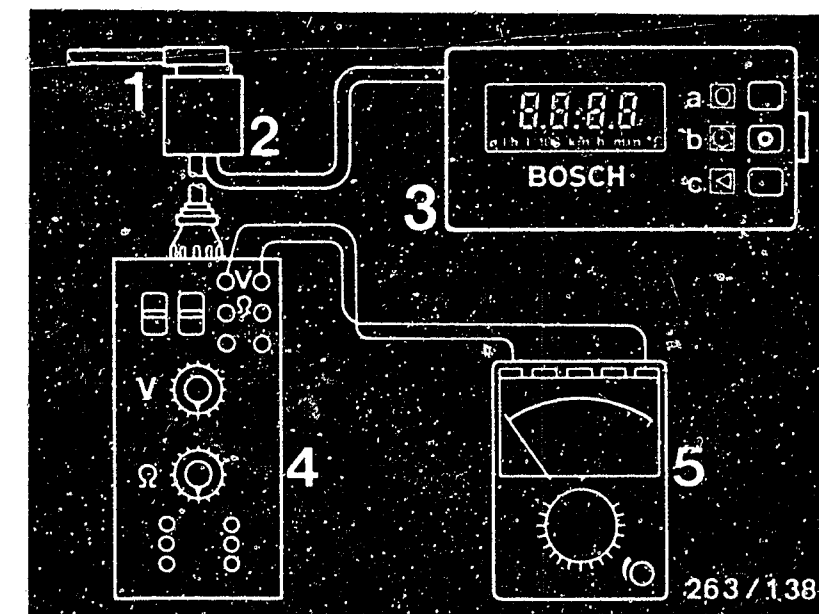
Nominal resistance:
approx. 0 Ω

Eliminate open circuit/contact resistance.

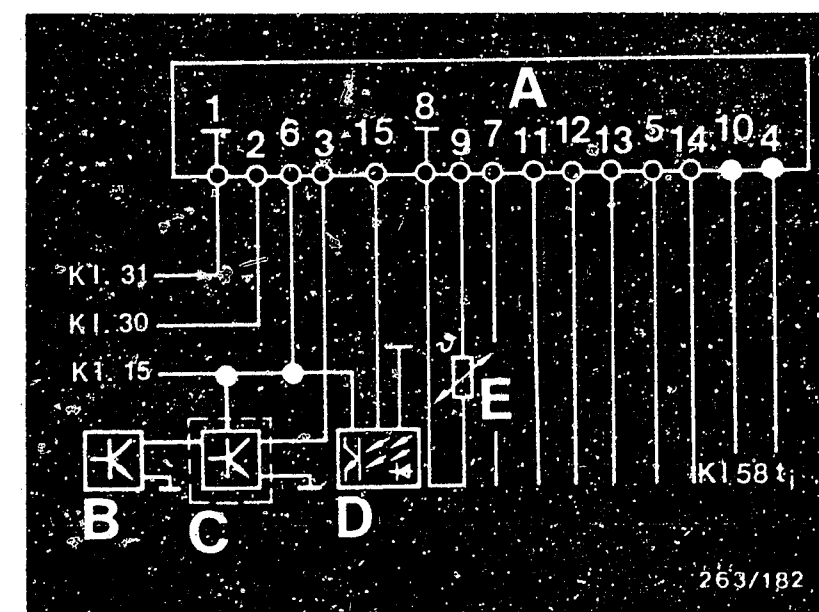
Note:

After rectifying voltage
stabilization at instrument cluster,
range on TC must be reset.

After testing, reconnect TC and tank-sensor plugs.



- 1 = 15-pin plug on vehicle
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Multimeter
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



Calibration of range of tank with keys "b" and "c" (see top picture)

Assuming that each supplied trip computer is preset at a nominal voltage of the tank sender corresponding to a fuel quantity of 7 l, it is possible to make a further, more accurate calibration which compensates for the tolerances of the tank and of the tank sender.

This calibration is performed as follows:

- Contents of tank must be precisely 7 liters
- Ignition on (not important whether engine running)
- Simultaneously press key "b" and key "c" > 1 sec:
trip computer is in "calibration mode" when 0 km appears on the display.
- By turning the calibration potentiometer (through hole in key "b", see bottom picture), set display to 65...70, corresponding to 7 liters in tank (see picture 6).

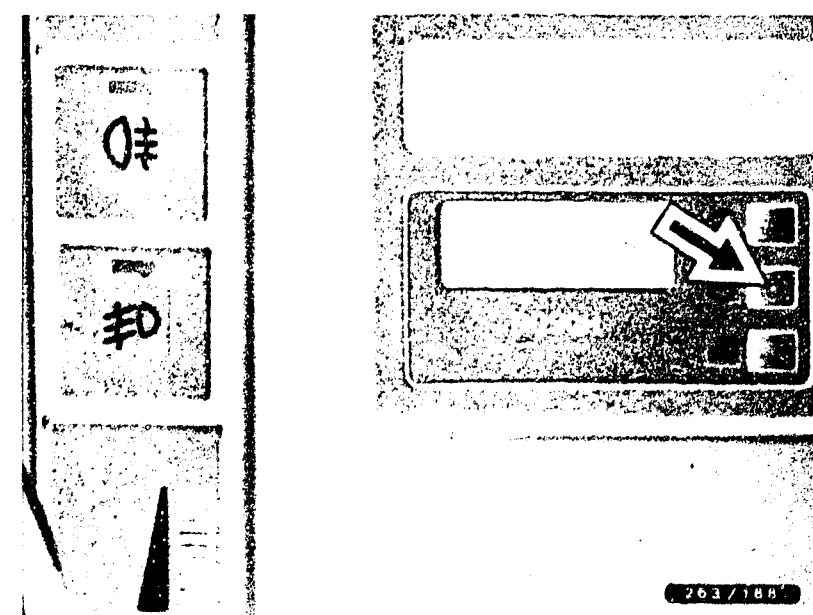
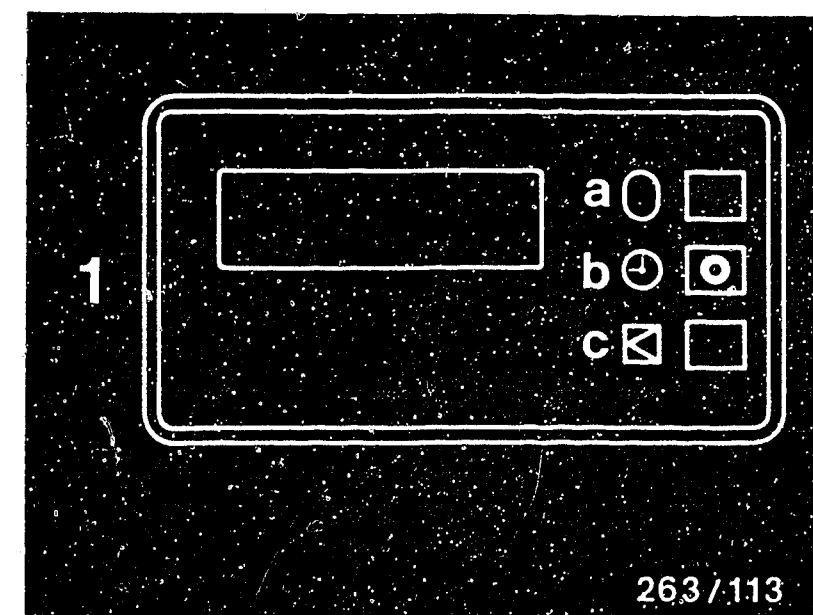
Note :

Potentiometer has a turning angle of max. 270°.

Turn carefully.

If previous range is known, the tank need not be emptied down to 7 l; the previous range can be set straight away at calibration potentiometer (in key "b"). Proceed in the same sequence as if 7 l in tank.

Calibration is completed when, after setting the above value, a different function is selected.



D21

Testing with universal test adapter

Alfa Romeo



D22

Testing with universal test adapter

Alfa Romeo



Test step 15:

Component/function

Voltage supply for TC via ignition lock

Operation:

Position

Program switch "V"
Program switch " Ω "
Test key

5
-
-

Measuring equipment:

Multimeter

Measuring range:

0 ... 15 V

Connection: See upper illustration, test jacks: red = plus
black = negative

Operation in vehicle:

Ignition "on"

Test specification (reading):

$U_{\text{batt}} \geq 12 \text{ V}$

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

No voltage after "ignition on"

$U_{\text{batt}} < 12 \text{ V}$

Testing with multimeter

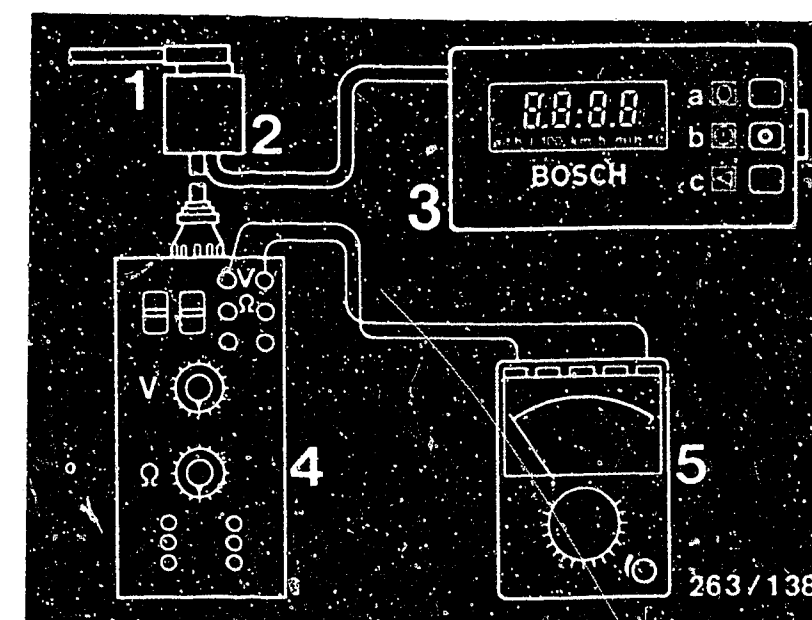
Switch off ignition. Pull TC plug.
Test lead from TC pin 6 to
ignition lock with ohmmeter.

Nominal resistance:
approx. 0Ω

Test fuse no. 15 (lower
illustration, arrow). Replace
defective fuse.

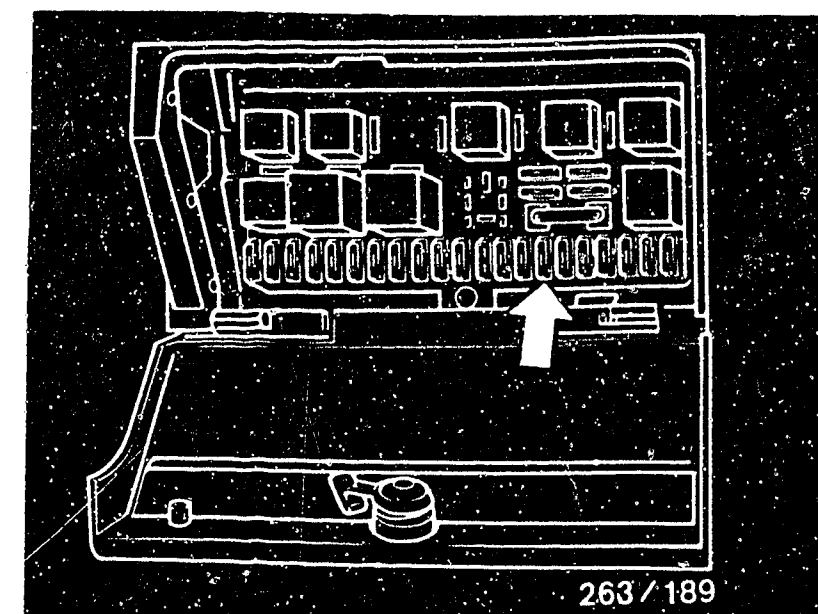
Eliminate open circuit/contact
resistance.

After testing, reinsert TC plug.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Multimeter

Fuse no. 15



D23

Testing with universal test adapter
Alfa Romeo



D24

Testing with universal test adapter
Alfa Romeo



Test step 16:

Component/function

Outside temperature sensor with leads to TC pin 9

Operation:

Position

Program switch "V"
Program switch " Ω "
Test key

6
-
-

Measuring equipment:

Multimeter

Measuring range:

0 ... 5 V

Connection: See upper illustration, test jacks: red = positive, black = negative

Operation in vehicle:

"Ignition on"

Test specification (reading):

Approx. 1.7 V at room temperature, approx. +20°C

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

No display or false display

Testing with multimeter:

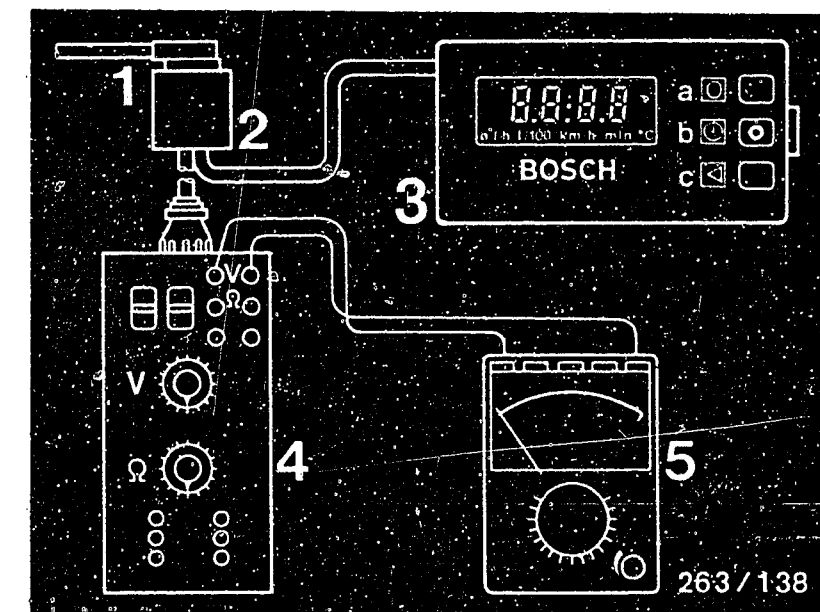
"Ignition off". TC plug pulled.

Test lead from vehicle wiring-harness plug pin 9 to plug connection on temperature sensor with ohmmeter.

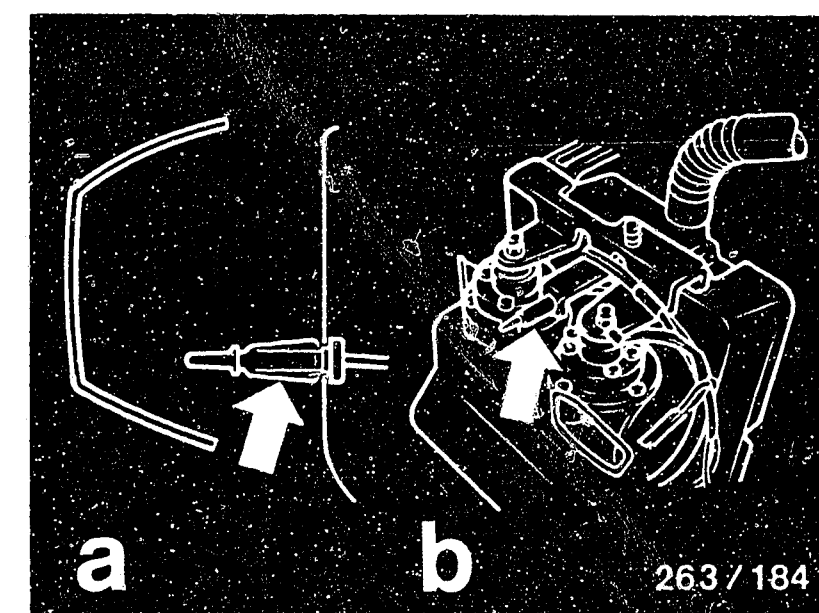
Nominal resistance: approx. 0 Ω

Outside temperature sensor mechanically damaged. Visual inspection (lower illustration, arrows). Display $\geq +80$ °C at normal room temperature (approx. +20 °C) indicates short circuit in lead. Display $\leq +35$ °C at normal room temp. (+20°C) indicates open circuit in lead.

An obviously too-low temperature reading indicates corrosion on plug connection to TC wire harness. Eliminate open circuits/contact resistance. Replace defective outside temperature sensor or lead. To remove the outside temperature sensor, press the two spring lugs together and pull temperature sensor out towards the rear.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Multimeter



E1

Testing with universal test adapter
Alfa Romeo



E2

Testing with universal test adapter
Alfa Romeo



Test step 17:

Component/function

Voltage supply for illumination of TC at pin 10

Operation:

Position

Program switch "V"
Program switch "Ω"
Test key

7
-
-

no

Measuring equipment:

Multimeter

Measuring range:

0 ... 5 V

Connection: See upper illustration, test jacks: red = positive, black = negative

Operation in vehicle:

"Ignition on", "light on"

Test specification (reading):

$U_{batt} \geq 12 \text{ V}$

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

No illumination

Testing with multimeter

Switch off ignition and light.
Test lead from vehicle wiring-harness plug pin 10 to term. 58 with ohmmeter.

Nominal resistance:
approx. 0 Ω.

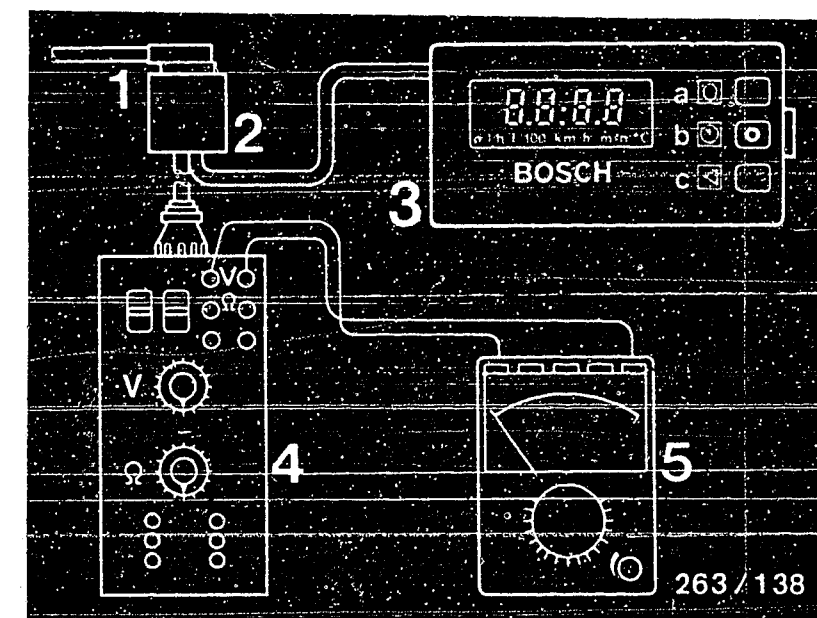
Bulb in TC defective.
(Lower illustration).

Test whether plug at TC has correct seating/contact.

Eliminate open circuit/contact resistance.

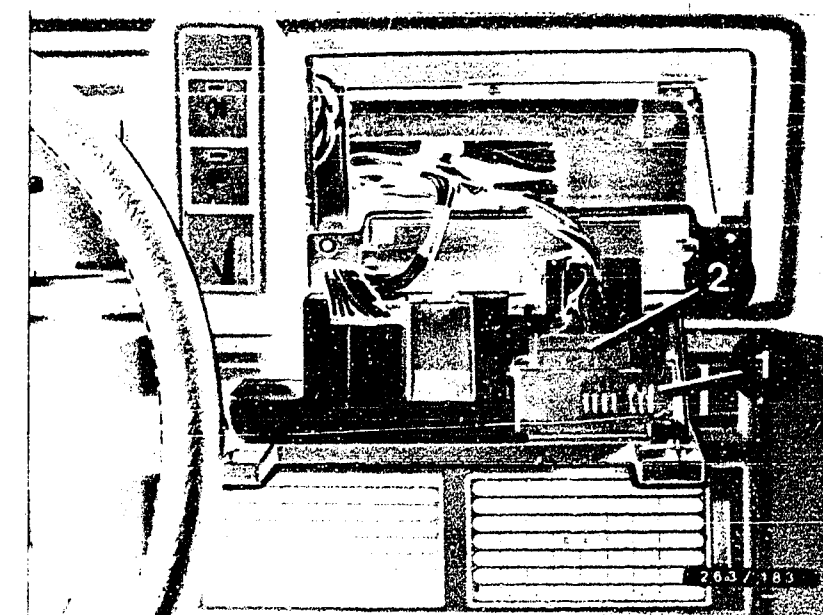
Replace defective bulb.

After testing, reinsert plug at TC.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Multimeter

- 1 = TC
- 2 = 15-pin plug on vehicle wiring harness



E3

Testing with universal test adapter
Alfa Romeo



E4

Testing with universal test adapter
Alfa Romeo



(Only on Alfa 75 with LE-Jetronic, code:8.181, 7.184; L-Jetronic, code: 9.72; carburetor, code: 8.56, 7.56, 9.10; Motronic, code:8.88, 8.84, 7.88, 7.84, 9.90, 9.84)

Test step 18:

Component/function

Encoding lead 2 at TC pin 7

Operation:

Position

Program switch "V"
Program switch "Ω"
Test key

8
-
-

Measuring equipment:

Motortester, e.g. MOT 201

Connection: See upper illustration. Test jacks on universal test adapter

Operation in vehicle:
Engine running in idle.

Test specification (reading):
Oscillogram, see upper illustration

$U_1 - U_2 \geq 3 \text{ V}$

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

No timed voltage is detectable on oscilloscope.

Testing with multimeter

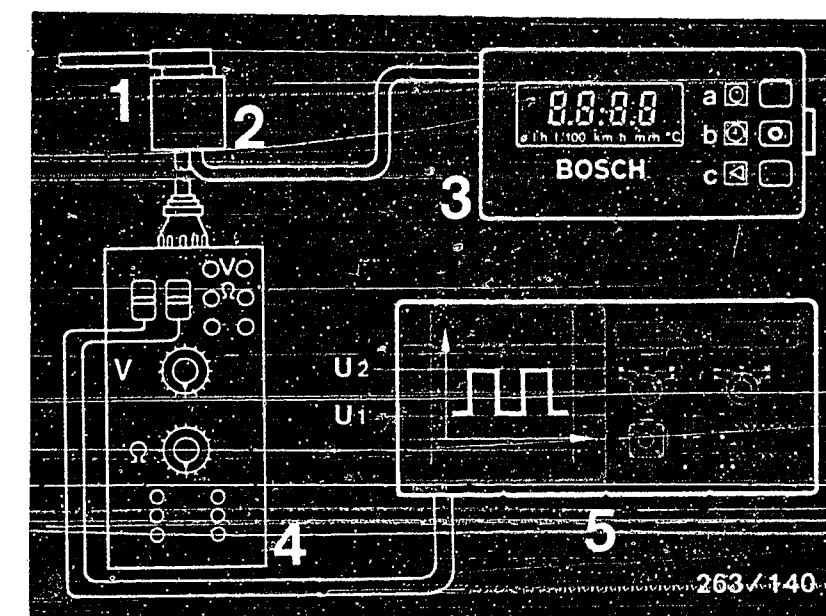
Switch engine off. Disconnect TC plug.

Test lead from vehicle wiring-harness plug P 7 to ground with ohmmeter.

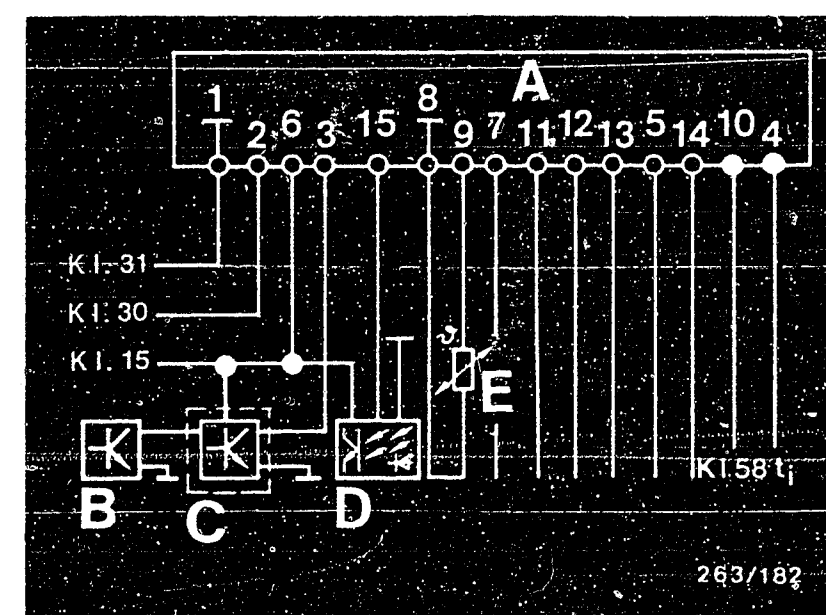
Nominal resistance:
approx. 0Ω

Eliminate open circuit/contact resistance.

After testing, reinsert TC plug.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Motortester with oscilloscope
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



E5

Testing with universal test adapter
Alfa Romeo



E6

Testing with universal test adapter
Alfa Romeo



(Does not apply to Alfa 75 with carburetor. Motronic, code:8.84, 8.85, 7.84, 7.85, 9.84, 9.85)

Test step 19:

Component/function

Encoding lead 3 at TC pin 11

Operation:

Program switch "V"
Program switch " Ω "
Test key

Position

9
-
-

Measuring equipment:

Motortester, e.g. MOT 201

Connection: See upper illustration. Test jacks on universal test adapter

Operation in vehicle:
Engine running in idle.

Test specification (reading):
Oscillogram, see upper illustration

$U \geq 3 \text{ V}$

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

No timed voltage is detectable on oscilloscope.

Testing with multimeter

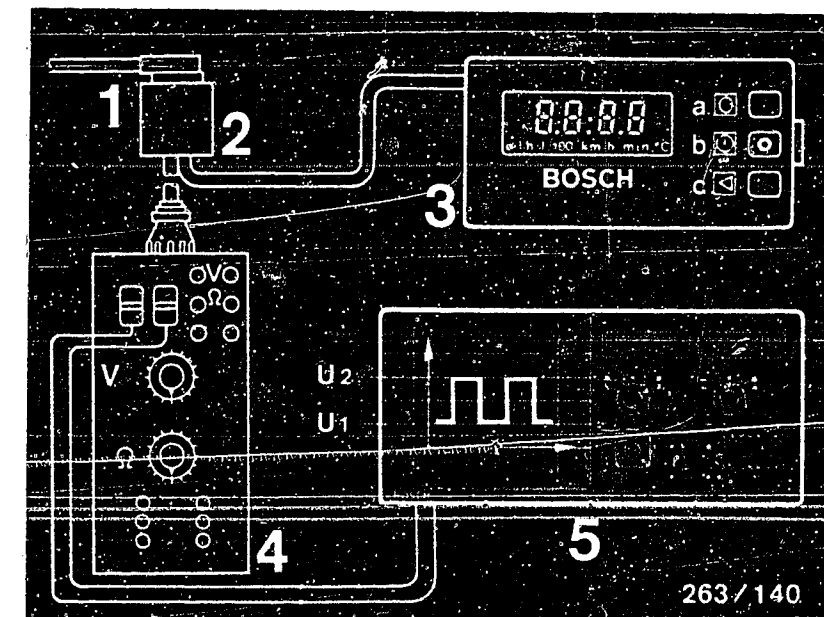
Switch off engine, pull TC plug.

Test lead from wiring-harness plug pin 11 to ground with ohmmeter.

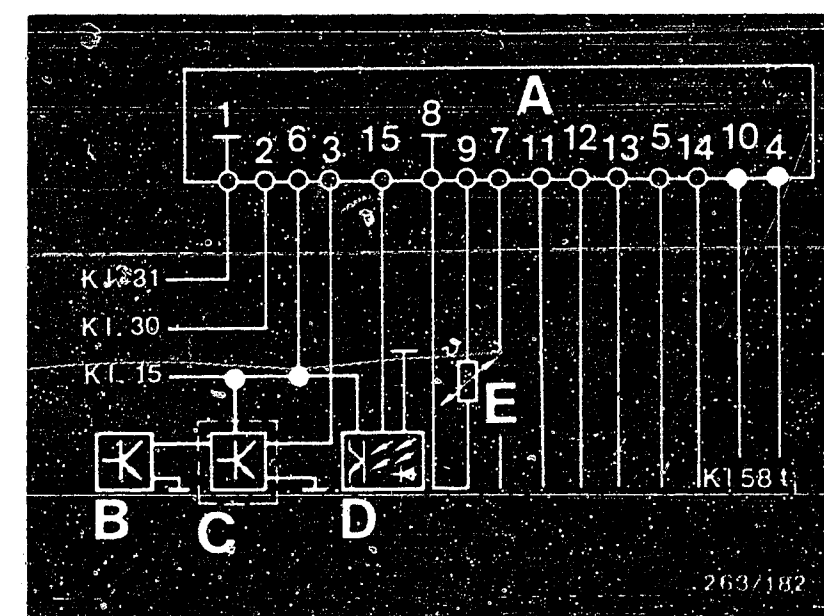
Nominal resistance:
approx. 0Ω

Eliminate open circuit/contact resistance.

After testing, reinsert TC plug.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Motortester with oscilloscope
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



E7

Testing with universal test adapter
Alfa Romeo



E8

Testing with universal test adapter
Alfa Romeo



(Does not apply to Alfa 75 with Motronic, code:8.88, 8.84, 8.89, 7.88, 7.89, 7.84, 9.91, 9.90, 9.84)

Test step 20:

Component/function

Encoding lead 4 at TC pin 12

Operation:

Position

Program switch "V"
Program switch "Ω"
Test key

10
-
-

Measuring equipment:

Motortester, e.g. MOT 201

Connection: See upper illustration, test jacks on universal test adapter

Operation in vehicle:

Engine running in idle.

Test specification (reading):

Oscillogram, see upper illustration

$U_1 - U_2 \geq 3 \text{ V}$

Is value within tolerance?

yes

Continued on next micro-page

no

Trouble-shooting:

Defect:

No timed voltage is detectable on oscilloscope.

Testing with multimeter

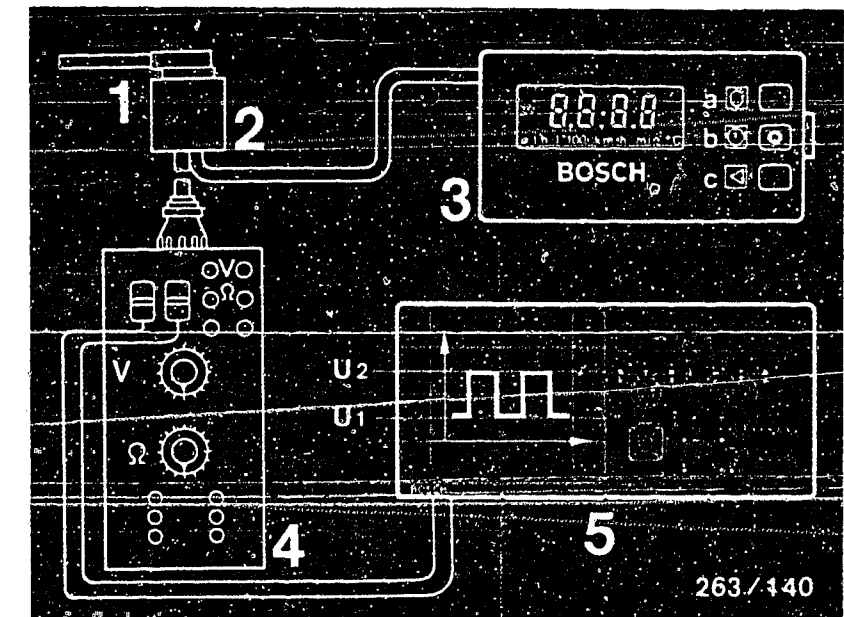
Switch off engine, pull TC plug.

Test lead from wiring-harness plug pin 12 to ground with ohmmeter.

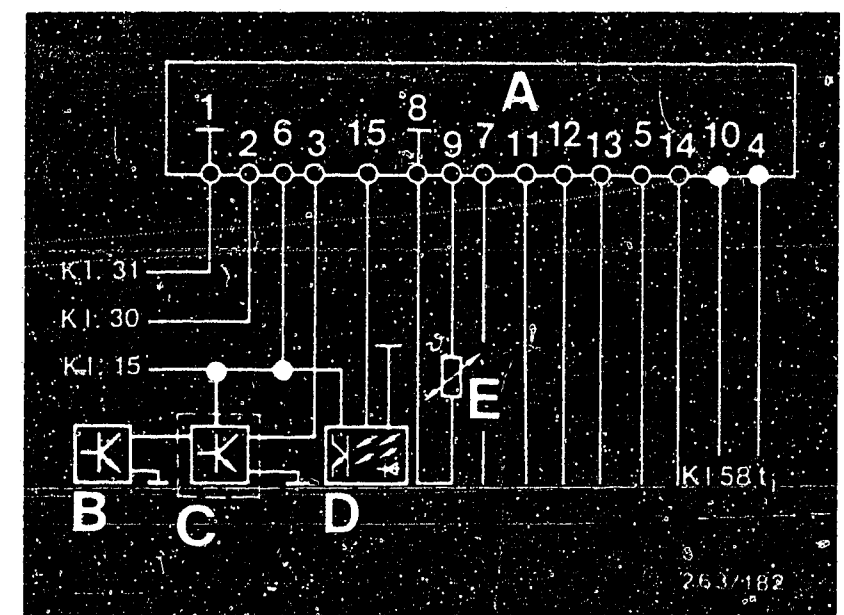
Nominal resistance:
approx. 0Ω

Eliminate open circuit/contact resistance.

After testing, reinsert TC plug.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Motortester with oscilloscope
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



E9

Testing with universal test adapter
Alfa Romeo



E10

Testing with universal test adapter
Alfa Romeo



(Does not apply to Alfa 75 with Motronic, code:7.85, 8.85, 9.95, 9.88)

Test step 21:

Component/function

Encoding lead 5 at TC pin 13

Operation:

Position

Program switch "V"

11

Program switch "Ω"

-

Test key

-

Measuring equipment:

Motortester, e.g. MOT 201

Connection: See upper illustration, test jacks on universal test adapter

Operation in vehicle:

Engine running in idle.

Test specification (reading):

Oscillogram, see upper illustration

$U_1 - U_2 \geq 3 \text{ V}$

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

No timed voltage detectable on oscilloscope.

Testing with multimeter

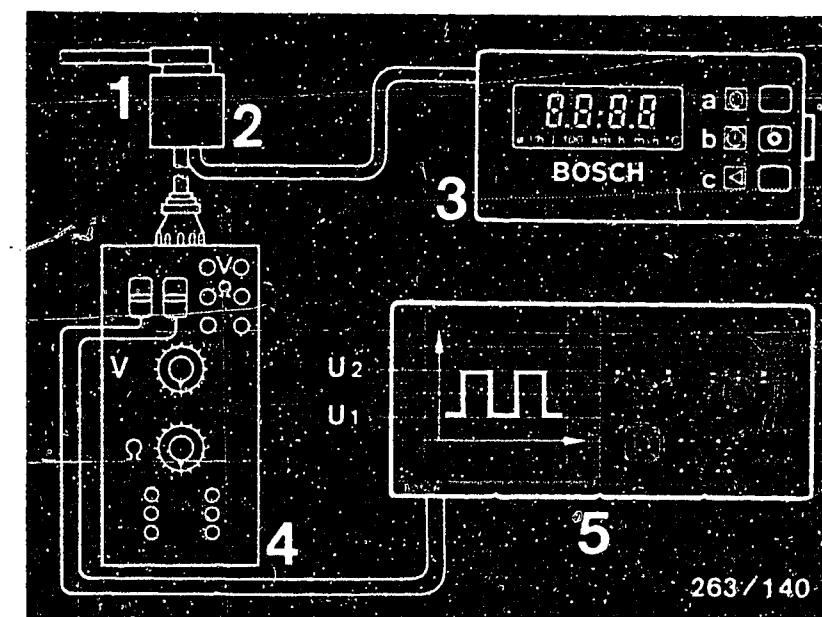
Switch off engine, pull TC plug.

Test lead from wiring-harness plug pin 13 to vehicle ground with ohmmeter.

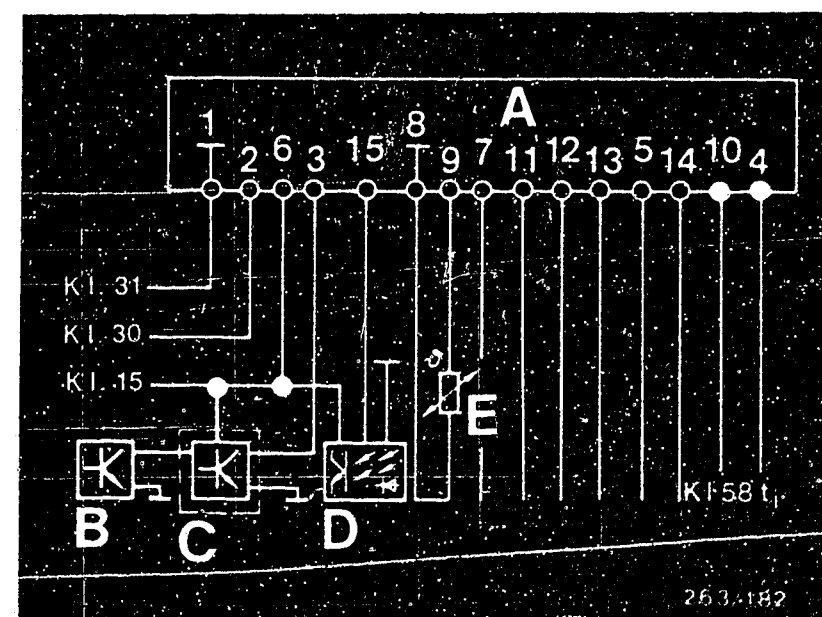
Nominal resistance:
approx. 0Ω

Eliminate open circuit/contact resistance.

After testing, reinsert TC plug.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Motortester with oscilloscope
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



E11

Testing with universal test adapter
Alfa Romeo



E12

Testing with universal test adapter
Alfa Romeo



(Only on Alfa 75 with L-Jetronic code:8.81; Motronic, code: 8.85, 8.89, 7.85, 7.89, 9.91, 9.85)

Test step 22:

Component/function

Voltage stabilization for tank sensor

Operation:

Position

Program switch "V"

12

Program switch "Ω"

-

Test key

-

Measuring equipment:

Multimeter

Measuring range:

0 ... 15 V

Connection: See upper illustration, test jacks: red = positive, black = negative

Operation in vehicle:

Ignition "on"

Tank-sensor plug disconnected.

Test specification (reading):

approx. 12 V

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

Voltage < or > 12 V

Testing with multimeter

Switch off engine, disconnect TC plug.

Test lead from instrument cluster pin 14 to tank-sensor plug with ohmmeter.

Nominal resistance:
approx. 0 Ω

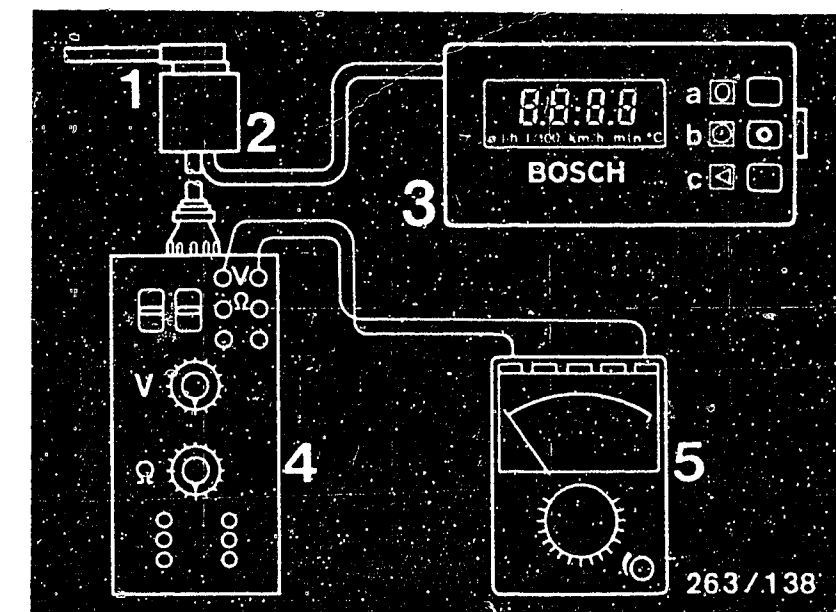
Test instrument-cluster supply voltage at tank plug with ignition "on" using voltmeter.

Nominal voltage: approx. 12 V

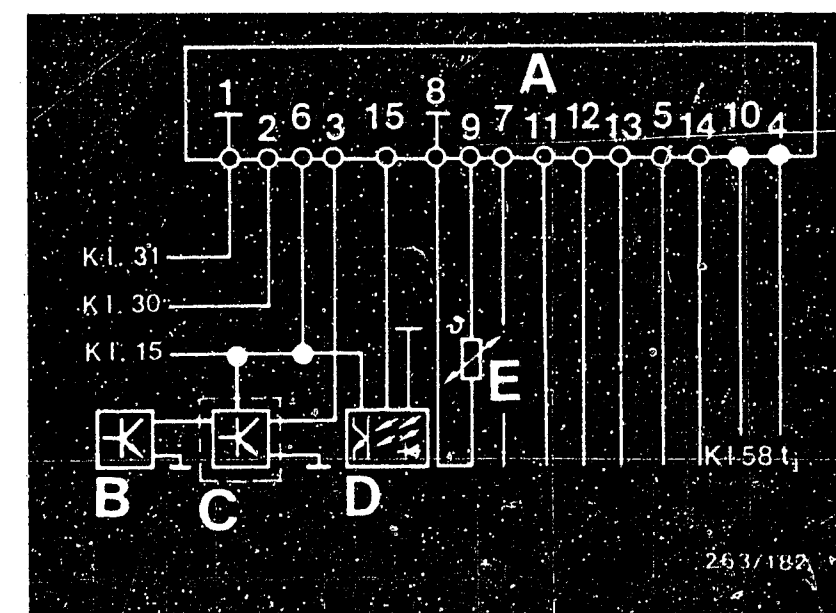
Eliminate open circuit/contact resistance. Rectify voltage stabilization for tank sensor.

After rectifying voltage stabilization, range on TC must be reset.

After testing, reinsert TC and tank-sensor plugs.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Multimeter
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



E13

Testing with universal test adapter
Alfa Romeo



E14

Testing with universal test adapter
Alfa Romeo



Calibration of range of tank with keys "b" and "c" (see top picture)

Assuming that each supplied trip computer is preset at a nominal voltage of the tank sender corresponding to a fuel quantity of 7 l, it is possible to make a further, more accurate calibration which compensates for the tolerances of the tank and of the tank sender.

This calibration is performed as follows:

- Contents of tank must be precisely 7 liters
- Ignition on (not important whether engine running)
- Simultaneously press key "b" and key "c" > 1 sec:
trip computer is in "calibration mode" when 0 km appears on the display.
- By turning the calibration potentiometer (through hole in key "b", see bottom picture), set display to 65...70, corresponding to 7 liters in tank (see picture 6).

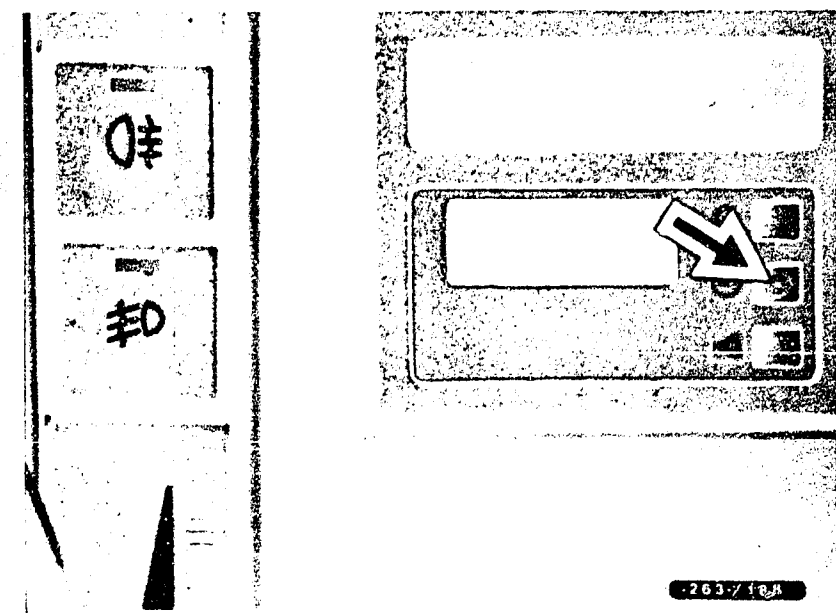
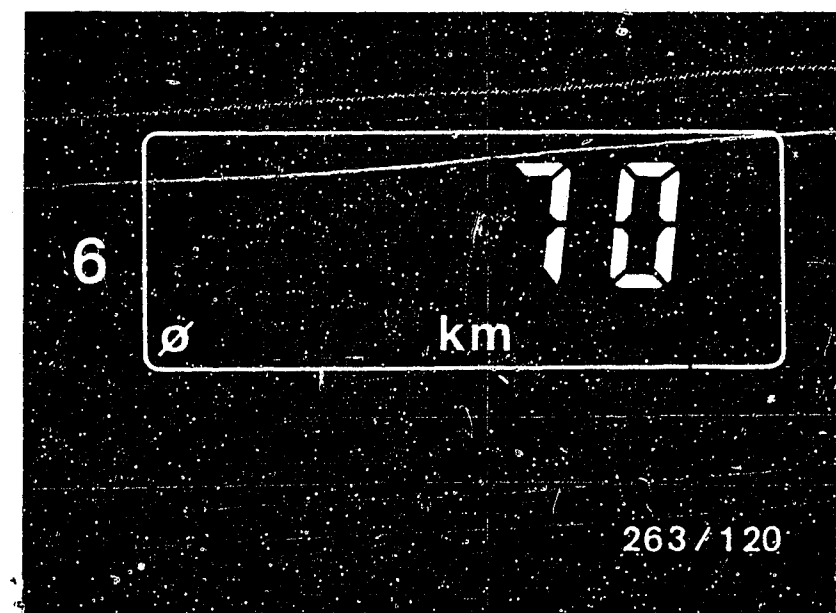
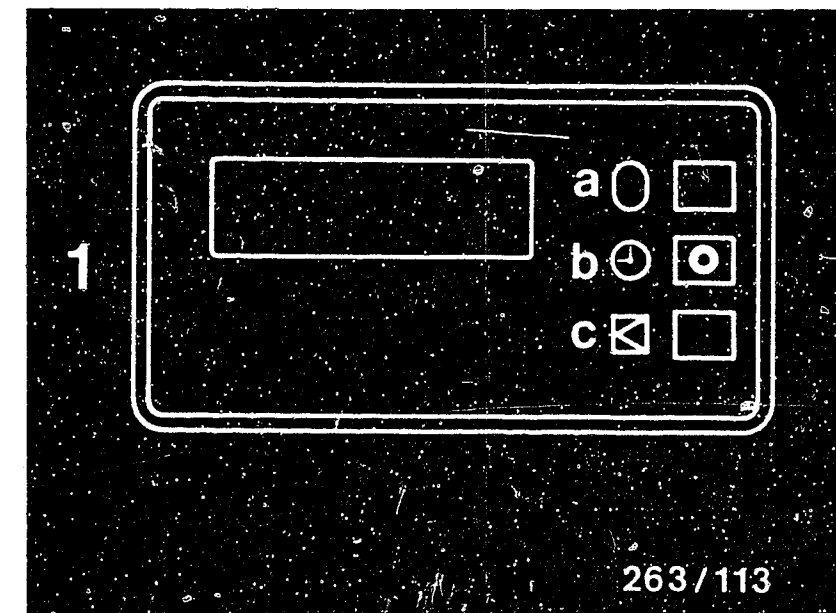
Note :

Potentiometer has a turning angle of max. 270°.

Turn carefully.

If previous range is known, the tank need not be emptied down to 7 l; the previous range can be set straight away at calibration potentiometer (in key "b"). Proceed in the same sequence as if 7 l in tank.

Calibration is completed when, after setting the above value, a different function is selected.



E15

Testing with universal test adapter

Alfa Romeo



E16

Testing with universal test adapter

Alfa Romeo



(Only on Alfa 75 with L-Jetronic, code:8.181 and Motronic, code: 8.85, 8.89, 7.85, 7.89, 9.91, 9.85)

Test step 23:

Component/function

Tank sensor with leads to TC pin 14

Operation:

Position

Program switch "V"

12

Program switch "Ω"

-

Test key

-

Measuring equipment:

Multimeter

Measuring range:

0 ... 15 V

Connection: See upper illustration, test jacks: red = positive, black = negative

Operation in vehicle:

"Ignition on", plug at tank sensor connected.

Test specifications (reading):

Tank full	approx. 1.5 V
Tank 3/4 full	approx. 3.5 V
Tank 1/2 full	approx. 5.0 V
Tank 1/4 full	approx. 6.7 V
Tank on reserve	approx. 7.0 V
Tank empty	approx. 7.5 V

Is value within tolerance?

yes

Continued on next micro-page

Trouble-shooting:

Defect:

No reading or incorrect reading

Testing with multimeter

Switch off ignition, pull plug at tank sensor.

Test lead from vehicle wiring-harness plug pin 14 to tank-sensor plug with ohmmeter.

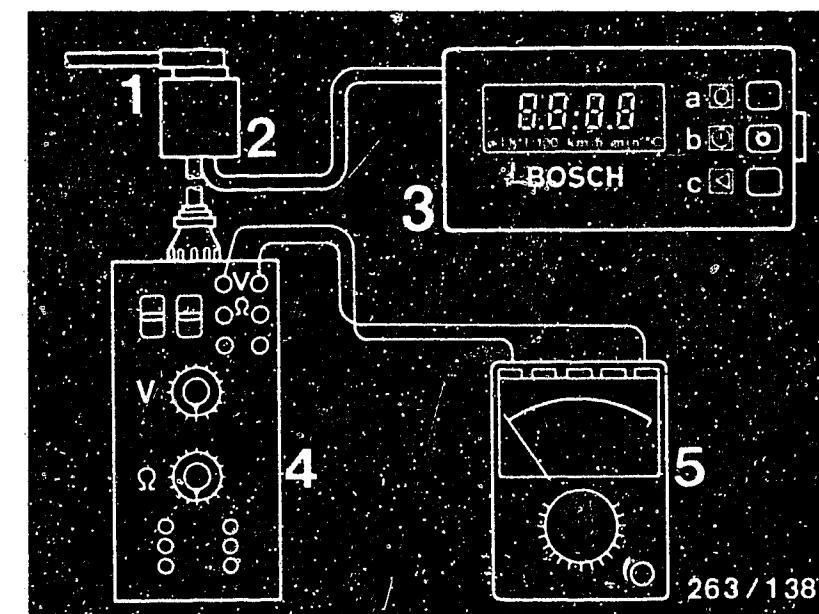
Nominal resistance:
approx. 0 Ω

Eliminate open circuit/contact resistance in lead.

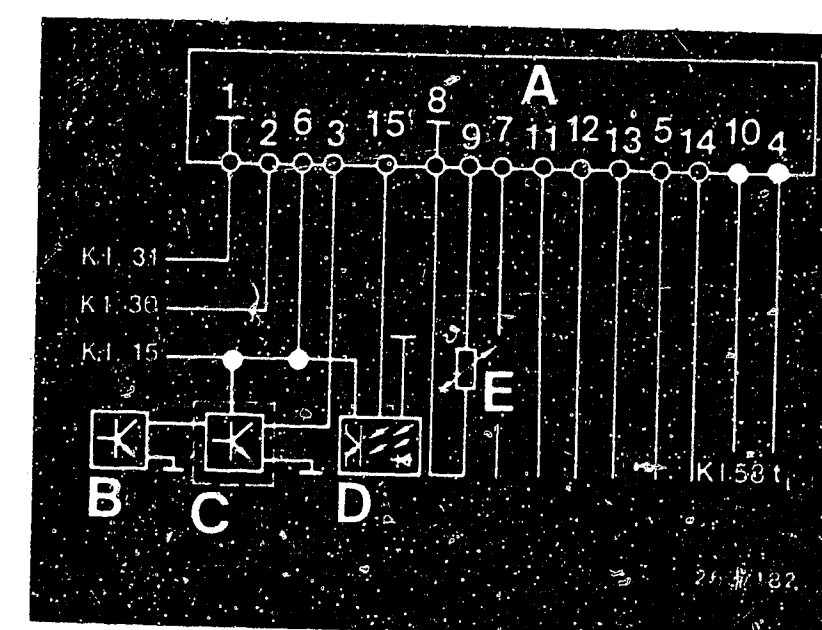
Tank sensor defective.

Replace defective tank sensor.

After testing, reinsert TC and tank-sensor plugs.



- 1 = 15-pin plug on vehicle wiring harness
- 2 = Adapter lead
- 3 = TC
- 4 = Universal test adapter
- 5 = Multimeter
- A = TC
- B = Distance sensor
- C = Distance-pulse adaptation control unit
- D = Fuel-consumption sensor
- E = Outside temperature sensor



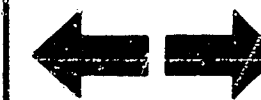
E17

Testing with universal test adapter
Alfa Romeo



E18

Testing with universal test adapter
Alfa Romeo



Calibration of range of tank with keys "b" and "c" (see top picture)

Assuming that each supplied trip computer is preset at a nominal voltage of the tank sender corresponding to a fuel quantity of 7 l, it is possible to make a further, more accurate calibration which compensates for the tolerances of the tank and of the tank sender.

This calibration is performed as follows:

- Contents of tank must be precisely 7 liters
- Ignition on (not important whether engine running)
- Simultaneously press key "b" and key "c" > 1 sec:
trip computer is in "calibration mode" when 0 km appears on the display.
- By turning the calibration potentiometer (through hole in key "b", see bottom picture), set display to 65...70, corresponding to 7 liters in tank (see picture 6).

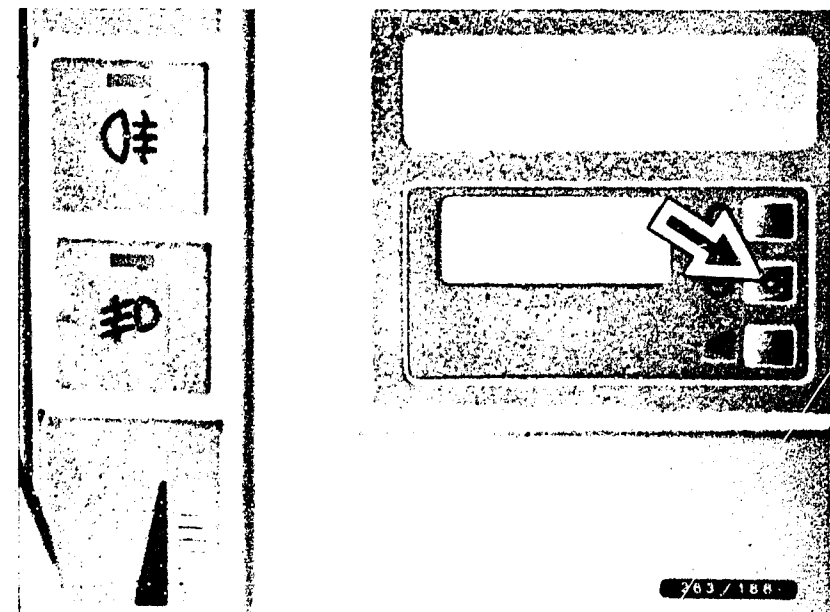
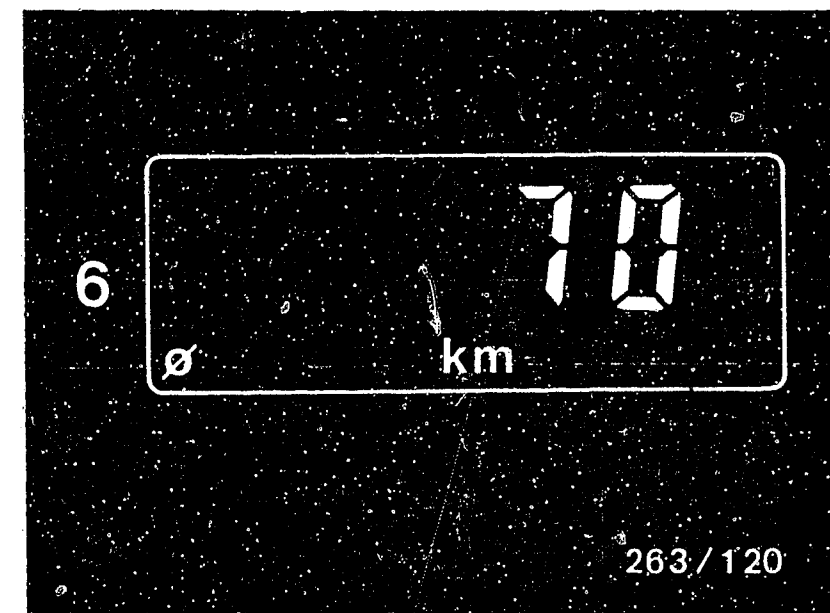
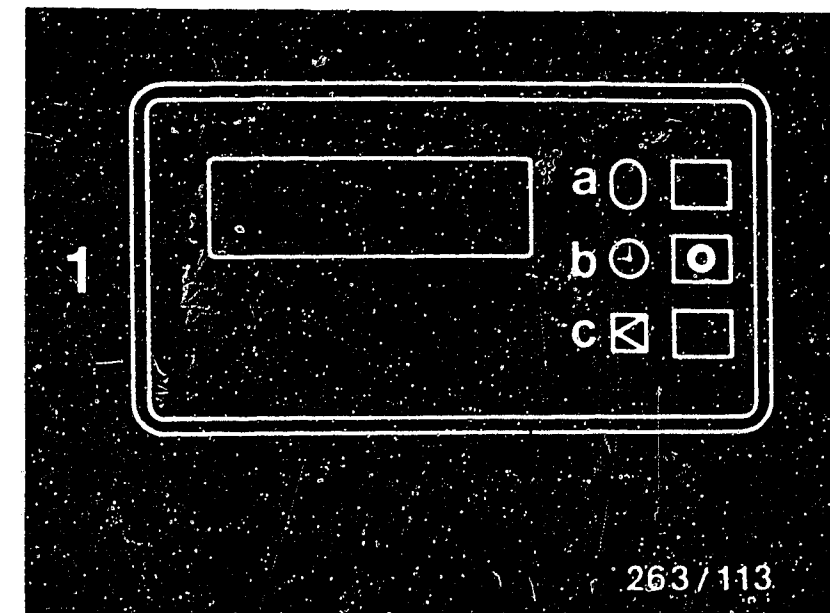
Note :

Potentiometer has a turning angle of max. 270°.

Turn carefully.

If previous range is known, the tank need not be emptied down to 7 l; the previous range can be set straight away at calibration potentiometer (in key "b"). Proceed in the same sequence as if 7 l in tank.

Calibration is completed when, after setting the above value, a different function is selected.



E19

Testing with universal test adapter
Alfa Romeo



E20

Testing with universal test adapter
Alfa Romeo



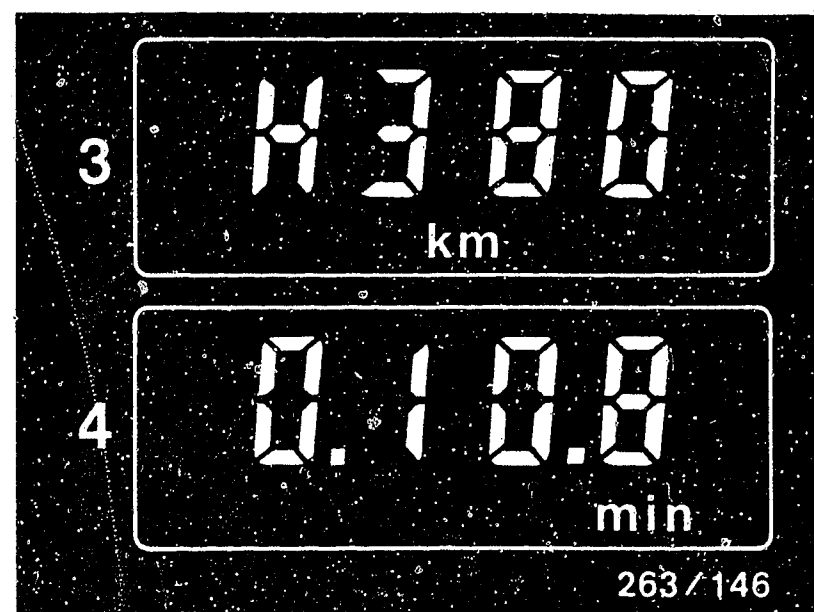
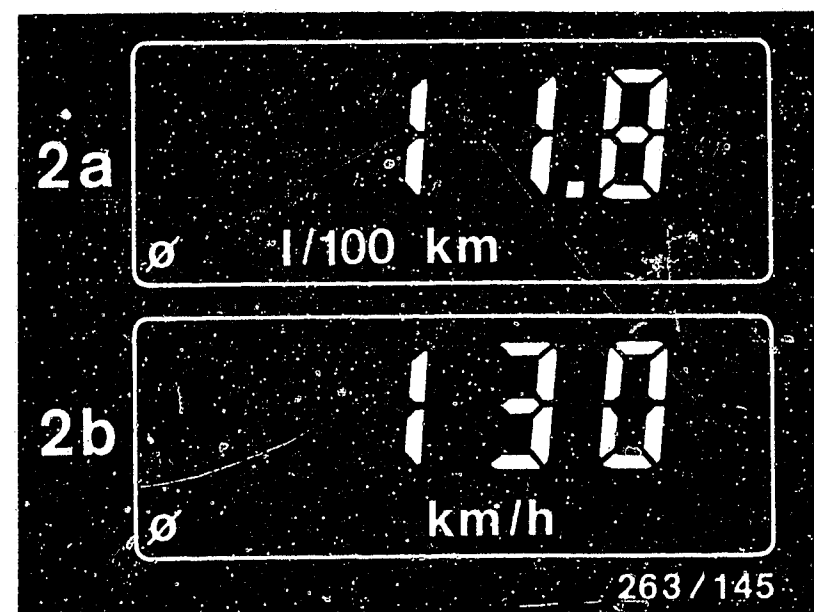
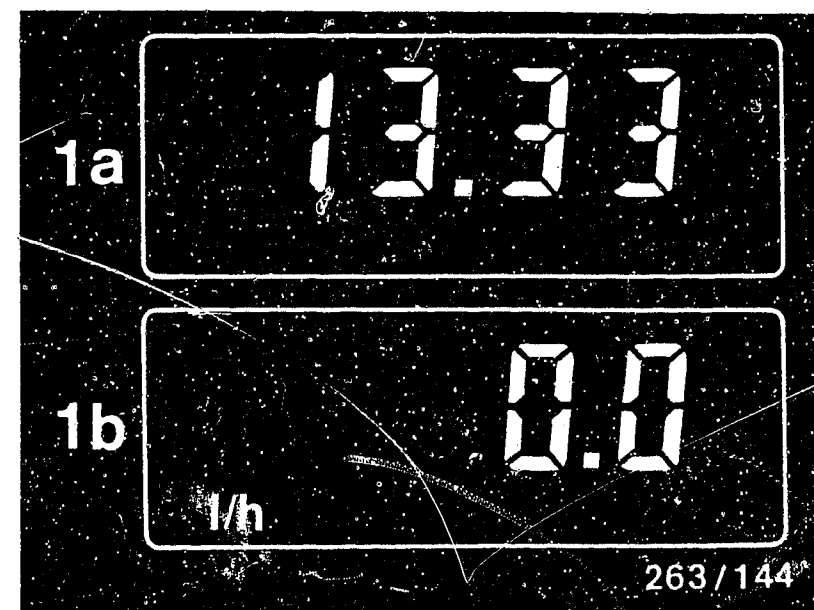
8. Functional test of trip computer (extract from owner manual)

Functional test with ignition OFF

1. Only time of day is indicated.
No other functions can be selected (see picture 1a).

Functional test with ignition ON - engine not running, key c has been pressed

1. Without selecting a different trip computer function, time of day continues to be displayed (if tank contents > 7 l and battery not disconnected) (see picture 1a).
2. Select "inst. consumption". Instantaneous consumption 0.0 l/h is shown (vehicle and engine stopped). (See picture 1b).
3. Select "ave. consumption". The last calculated average consumption is shown. (See picture 2a).
4. Select "ave. speed". The last calculated average speed is shown. (See picture 2b).
5. Select "tank range (miles to empty)". Tank range, depending on tank level, is indicated. (See picture 3).
6. Select "stopwatch". The time as of pressing the start key is indicated. (See picture 4).
7. Select "outside temperature". The actual outside temperature is indicated (no illustration here).



E21

Final functional test

Alfa Romeo



E22

Final functional test

Alfa Romeo

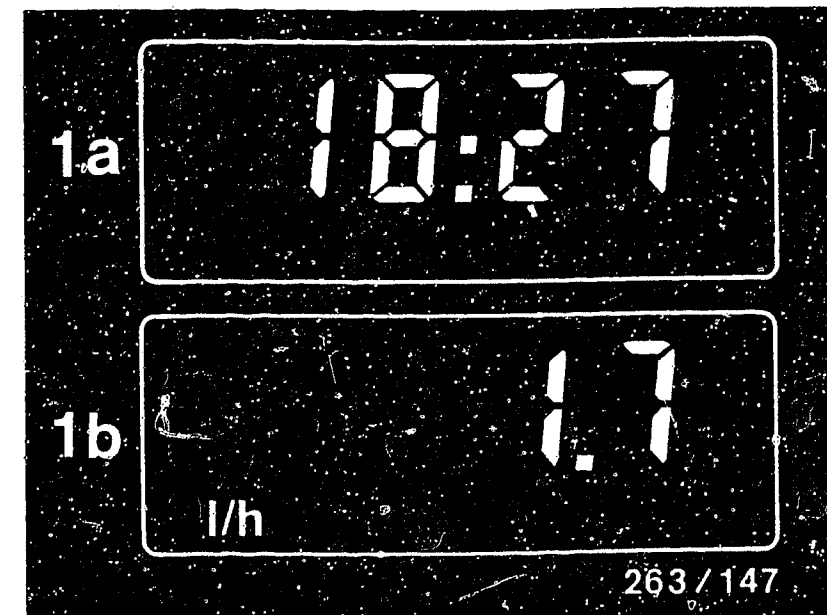


Functional test of trip computer (continued)

Functional test - engine running (idle speed), vehicle stopped

1. When the time priority key is pressed, the time of day is shown. (See picture 1a).
2. When "inst. consumption" is selected, the actual instantaneous consumption in l/h is shown. (See picture 1b).
3. When "ave. consumption" is selected, the last calculated average consumption is shown (vehicle stationary). (See picture 2a).
4. When "ave. speed" is selected, the last calculated average speed is shown. (See picture 2b).
5. When "tank range (miles to empty)" is selected, a reading corresponding to the tank level is shown (value between 0 and approx. 600 km). (See picture 3).
6. When "stopwatch" is selected, the time as of pressing the start button is shown. (No illustration here).
7. When "outside temperature" is selected, the actual outside temperature is shown. (See picture 4).

If all these functions can be selected, trip computer and input signals are O.K.



E23

Final functional test

Alfa Romeo



E24

Final functional test

Alfa Romeo



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